RARE BOOKS
QK1
.A306
v.12
1927

ADDISONIA

COLORED ILLUSTRATIONS

AND

POPULAR DESCRIPTIONS

OF

PLANTS

VOLUME 12
1927

B 10.00

PUBLISHED BY

THE NEW YORK BOTANICAL GARDEN

(ADDISON BROWN FUND)

MISSOURI BOTANICAL
SEP 21 1928
GARDEN LIBRARY.

THE SCIENCE PRESS
PRINTING COMPANY
LANCASTER, PA.

CONTENTS

Part 1

MARCH 31, 1927

PLATE		PAGE
385	Iris vinicolor	1
386	Iris Pseudacorus	3
387	Iris tripetala	5
388	Iris fulva	7
389	Iris flexicaulis	9
390	Iris rivularis	11
391	Iris Shrevei	13
392	Iris prismatica	15

Part 2

JUNE 30, 1927

393	Melia Azedarach	17
394	Arthropodium cirrhatum	19
395	Sabinea punicea	21
396	Angelonia salicariaefolia	23
397	Quercus serrata	25
398	Asarum canadense	27
399	Zantedeschia aethiopica	29
400	Dudleya albiflora	31

Part 3

OCTOBER 28, 1927

401	Stahlia monosperma	33
402	Exogonium arenarium	35
403	Niopa peregrina	37
404	Erythrina Corallodendrum	39
405	Chamaefistula antillana	41
406	Sagittaria lancifolia	43
407	Canavali maritima	45
408	Agalinis fasciculata	47

Part 4

DECEMBER 31, 1927

409 Tillandsia tricolor 49
410 Rivina humilis 51
411 Gaultheria procumbens 53
412 Jasminum humile 55
413 Malus micromalus 57
414 Rhipsalis Neves-Armondii 59
415 Viburnum rufidulum 61
416 Moraea iridioides 63
Index 65

IRIS VINICOLOR

(Plate 385)

IRIS VINICOLOR

Wine-colored Flag

Native of the Mississippi Delta

Family IRIDACEÆ — IRIS Family

Iris vinicolor Small, sp. nov.

Peninsulas, river-deltas, and mountain peaks are likely places for especially interesting plants. We now know the iris-flora of peninsular Florida fairly well. The opposite may be said of that of the Mississippi River delta. While making a crossing of this delta about the latitude of New Orleans, in the spring of 1925, we fortunately happened there at the time the native iris was in flower. Having studied the Florida iris in the field for several years, we at once noticed the difference in the species. One of the fundamental reasons for the differences is that the Florida plants grow in a soil with silicious sand as a basis, while the Louisiana ones inhabit a sticky marl.

This wine-colored flag was discovered early one April morning in 1925, while driving from the crossing of Lake Pontchartrain to New Orleans, by Edgar T. Wherry and the writer, a few miles south of the original station of *Sabal Deeringiana*.

The ancestral history of this vinaceous flag is as obscure as that of its geographical associate, the red-flag. At any rate, its ancestors must have had a refuge in the ancient highlands whence they passed into the Coastal Plain. The possibilities within those ancestors conspired through the ages to produce a flower in color quite distinctive from any other of our flags, as is conspicuously evidenced by the accompanying plate. This illustration was made from a plant from the original collection, which survived the winter of 1925–26 in the iris plantation at the Garden. The type specimen is in the herbarium of the New York Botanical Garden. Eastern Louisiana was visited again in the spring of 1926 for observing and collecting living material of *Iris*. Numerous colonies were found in the low country south of Lake Pontchartrain and in the higher country about Abita Springs. Although we know but little about the flags of the lower Mississippi Valley, we doubt if this species ranges very far inland. The flowers of the blue types are beautiful, those of *Iris fulva* are odd; those of *Iris vinicolor* are exquisite.

The golden-yellow stripe in the vinaceous-purple sepal lights up the flower in a striking way, especially when seen in the half-shade of the swamps of its native haunts. It also flourishes in the open.

Several hundred flower-stems frequently comprise the colonies in favorable situations. The swamp, not the stream-bank, is the home of this flag. The flower-stems hold the pods erect as they are maturing, but the full-grown pods lie on the ground until the corky seeds fall out and are scattered by rains or floods.

The wine-colored flag has a rather slender but fleshy rootstock. The leaves are erect, mostly three or four together, one to three feet long. The blades are narrowly linear-attenuate, pliable, bright green. The flower-stalk is rather slender, mostly taller than the leaves, often with one or two short branches. The flowers are solitary or two together at the top of the stem. The involucre consists of two main bracts, the longer one attenuate and exceeding the flower. The pedicel is shorter than the ovary. The hypanthium covering the ovary is six-angled, green. The perianth-tube is cylindric, nearly as long as the ovary in anthesis. The three sepals are remate, two and a half to three inches long, spreading and somewhat recurved, vinaceous purple within and without, copiously but obscurely veined with darker forking lines, with the crest of the claw extending up into the base and there golden-yellow or more yellow than in the claw and with more or less purple-black about the tip of the crest and a line of purple-black running up into the middle of the blade. The claw is shorter than the blade, yellowish green, veined and flecked with red-purple. The three petals are somewhat shorter than the sepals, spreading, spatulate, mainly vinaceous-purple, paler without than within. The blade is deep vinaceous purple within, with a few forking darker lines. The claw is greenish yellow striate—pale and dark—and a greenish or darker line runs to the tip of the blade. The three stamens are an inch to an inch and an eighth long. The filaments are green, except the yellowish base. The anthers are ochroleucous, longer than the filaments, slightly tapering to the apex. The style-branches are an inch to an inch and a quarter long, linear-elliptic, or slightly broadened upward, concave, green and purple-tinged without, reddish purple except the pale margins, and with a sharp median ridge within. The style-appendages are erect and somewhat recurved, nearly or quite a half inch long, half-deltoid or half-ovate, acute, finely erose-toothed, vinaceous purple. The stigma is two-lobed. The capsule is ellipsoid to ellipsoid-obovoid, two to three inches long, drooping, bright green, six-angled, the angles sharp, the walls rather thick. The seeds are borne in one row in some of the capsule-cavities, in two rows in others, thus they are either circular or half-circular, brown, very corky and roughened.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and foliage. Fig. 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Capsule. Figs. 5, 6.—Seeds.

IRIS PSEUDACORUS

(Plate 386)

IRIS PSEUDACORUS

Yellow-flag

Native of Europe, adjacent Asia, and Africa

Family IRIDACEAE — IRIS Family

Iris Pseudacorus L. Sp. Pl. 38. 1753.
Iris lutea Lam. Fl. Fr. 3: 496. 1778.
Iris palustris Moench, Meth. 528. 1794.

The great majority of our wild flags are natives. In this group of plants immigrants are few. Only three species have been recorded for North America, two from Europe, *Iris germanica*, and *I. Pseudacorus*—here illustrated—and one from Asia, *I. orientalis*. The subject of this note also grows naturally in western Asia and northern Africa. These three species, all with vigorous rootstocks, which are extensively cultivated as ornamentals, are likely to survive, take hold, and permanently establish themselves when and where, as surplus plants, they may be thrown out of gardens or left on abandoned homesteads. The numerous seeds produced will also help further to disseminate the plants thus established. That this flag, naturally accustomed to wet habitats, thrives almost equally well in dry gardens, was noted long ago, for the herbalist Gerard, in the sixteenth century, records that "although it be a water plant of nature, yet being planted in gardens it prospereth well."

There is evidence that this plant, so widespread, found its way into the domestic economy of our rather recent semi-barbaric ancestors. Moreover, early in the past century it was recorded that:

"The juice of the fresh root is excessively acrid, and has been found to act as an aperient, . . . The fresh roots have been mixed with the food of swine bitten by a mad dog, and they escaped the disease, when others bitten by the same dog died raving mad. The root loses most of its acrimony by drying . . . the roots are used to dye black; and in Jura they are boiled with copperas to make ink. A slice of the fresh root held between the teeth removes some kinds of tooth-ache."

The leaves are used as fodder and the brown seeds furnish a coffee-substitute. When mixed with our native cat-tails, bur-reeds, and sedges, it adds much to the attractiveness of the natural plant association. The flags of eastern North America lack yellow. Hence

a plant exhibiting the shades of yellow possessed by this iris is a welcome addition to our flora. It is now established in the Atlantic States north of Florida. The specimens from which the illustration was made were found in the swamps of the excavation for the one time proposed Jerome Park Reservoir, Borough of the Bronx, New York City.

The yellow flag has a stout extensively spreading rootstock. The leaves are erect but more or less arching and nodding at the tip, linear-attenuate, bright glossy green, mostly three quarters of an inch wide. The flower-stalk is two to three feet tall, rather stout, green, usually with one or two relatively short leaves or leaf-like bracts. The flowers are solitary or two together terminating the flower-stalk, and often in the axil of the upper leaf. The involucre subtending the flower has two main bracts neither of which exceeds the flower. The pedicel is about as long as the hypanthium at anthesis, not exserted beyond the involucre. The hypanthium surrounding the ovary is bluntly three-angled, green. The perianth-tube is cylindric-campanulate, about half as long as the ovary. The three sepals are two to three inches long, arching. The blade is suborbicular, oval or ovate, yellow, faintly striate, with lines and flecks of brown at the base, or the brown sometimes exaggerated into a blotch. The claw is broad, but with involute edges, much shorter than the blade, yellow and streaked and flecked with brown. The three petals are yellow, often pale, three quarters of an inch to fully an inch long, linear to linear-pandurate, obtuse. The three stamens are an inch to an inch and a quarter long. The filaments are white or nearly so. The anthers are pale yellow, shorter than the filaments. The three style-branches are about one and a half inches long, narrowly cuneate, but relatively broad, yellow, paler near the base than above. The style-appendages are obliquely ovate or somewhat triangular, more or less recurved, irregularly toothed and sometimes slightly incised. The stigma is entire. The capsule is cylindric-prismatic or somewhat ellipsoid, two to three inches long, bright green, often shining, turgid, bluntly three-angled, longer than the pedicel. The seeds, in one row in each capsule-cavity, are suborbicular or somewhat angular from pressure, corky, about a quarter of an inch in diameter or slightly longer.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and foliage. Fig, 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Capsule, green and unopened. Fig. 5.—Capsule, dry and open. Fig. 6.—Seed.

IRIS TRIPETALA

(Plate 387)

IRIS TRIPETALA

Bay Blue-flag

Native of the southeastern United States

Family IRIDACEAE — IRIS Family

Iris tripetala Walter, Fl. Car. 66. 1788.
Iris tridentata Pursh, Fl. Am. Sept. 30. 1814.

The environs of the second botanic garden in America contained four species of the genus *Iris*. At that time, in the early '80s of the eighteenth century, one of these, the violet-iris (*Iris verna*) had been seen and described by Linnaeus. This species, a small plant, represented one group of the genus *Iris*. The other three species, larger plants, and all unnamed at that time, each represented a different group. Thomas Walter named two of these, *Iris hexagona* and the subject of this note. The third species he erroneously referred to a more northern one.

This blue-flag still stands alone in its group. Its most prominent character is the relative size of the calyx and the corolla. The petals are very small. It was this character that suggested the specific name to Walter. However, he considered, perhaps inadvertently, the whole perianth to be the corolla and named it with reference to the three large sepals which are so prominent compared with the minute petals of the true corolla. Its coarse-wiry rootstock also distinguishes it from all our southern blue-flags. In its involucre and three-angled pod it is related to the *Iris versicolor* group.

The modern evidence indicates that the ancestors of this blue-flag advanced from the ancient interior highlands, as the Coastal Plain rose from the sea, along the tributaries of both the Atlantic Ocean to the eastward and the Gulf of Mexico to the southward. However, it, in the lapse of time, not only burned its bridges behind it as it advanced, but even left the immediate vicinity of creeks and river-banks and betook itself to low places in flatwoods, in the vicinity of ponds and ditches where water stands part of the year and at other times remains close to the surface. In migrating, the ancestors of the present plants, passing into the Atlantic Coastal Plain, developed somewhat different offspring from those going to the Gulf Coastal Plain. The form here illustrated may be considered the botanically typical one, for it came from the region of Walter's South Carolina botanical activities.

This iris there favors low meadow-like areas adjoining "bays," as pine-barren ponds are there termed; the iris plants occur in great masses in the black boggy soil that surrounds the "bays," with such plants as yellow-flycatchers (*Sarracenia*), spider-lilies (*Hymenocallis*), and other southern bog plants.

The shading of violet and yellow on the sepals gives the flower a very soft tone quite different from that of any of our other species.

The bay-flag has a long coarse-wiry zigzag or spiral, sometimes partly fibrous coated rootstock. The leaves are usually three to five together, erect, grass-like. The blades are narrowly linear-attenuate, glaucous, especially near the base, at least when young, finely ribbed. The flower-stalk is mostly one to one and a half feet tall, slender, green, zigzag. The flower is solitary at the top of the stem, or sometimes an additional one is borne on a branch from the upper node of the stem, erect, somewhat fragrant. The involucre subtending the flower is narrowly cylindric, two to two and a half inches long, of two main bracts, the inner one about twice as long as the outer or less, acute or mucronate. The pedicel is one and a quarter to one and three quarters inches long, about as long as the hypanthium plus the perianth-tube. The hypanthium surrounding the ovary is bluntly three-angled, green, much shorter than the pedicel. The perianth-tube is obscurely three-angled, slightly dilated upward, quite as long as the hypanthium. The three sepals are arching and drooping, remate, two to three inches long, crestless. The blade is suborbicular or oval, longer than the claw, violet, varying from pale to dark, paler without than within, except the yellow spot at the base and the white flecks that run off from the yellow. The claw is about one third of an inch wide, greenish within and bordered with violet, flecked or lined all over with violet, without the green is flecked only along the violet edges. The three petals are erect, inconspicuous, about a half inch long, elliptic-lanceolate or oblanceolate, the body contracted into a slender tip, greenish at the base, violet above, with several deeper-colored lines. The three stamens are an inch and a quarter to nearly an inch and a half long, with the filament and the anther about equal in length. The filament is green at the base, violet where it meets the violet-tinged anther. The three style-branches are broadly linear, about an inch and a quarter long, violet, slightly paler at the edges than at the middle. The stigma is entire. The style-appendages are semi-elliptic, curled upward, shallowly toothed above the middle, much overlapping, deep violet. The capsule is ellipsoid, an inch and a quarter to an inch and a half long, bluntly three-angled or three-sided, with a ridge on each face, shorter than the pedicel. The seeds, borne in two rows in each capsule-cavity, are somewhat corky, semicircular or lunate, about a quarter of an inch in diameter.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and foliage. Fig. 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Capsule. Fig. 5.—Seed.

PLATE 388

ADDISONIA

IRIS FULVA

(Plate 388)

IRIS FULVA

Red-flag

Native of the southcentral United States

Family IRIDACEAE — IRIS Family

Iris fulva Ker, Bot. Mag. *pl. 1496*. 1812.
Iris cuprea Pursh, Fl. Am. Sept. 30. 1814.

If more than one species once existed in the group which the red-flag typifies today, they have become extinct, unless additional ones exist in still unexplored nooks and corners in the Gulf States and contiguous territory.

It seems that the red-flag was discovered and collected independently along the lower Mississippi River twice shortly after the beginning of the last century, and also named and published independently twice about two years apart, as recorded above. The following note appeared with the first published account:

"An unrecorded and singular species, differing from any known to us in color and inflection of the corolla. Found spontaneous on the banks of the Mississippi, in low grounds not far from the town of New Orleans. Introduced into this country [England] in 1811, by Mr. Lyon, a very intelligent and industrious collector of North American plants. Hardy. Blossoms in June. Seeds freely, and is easily propagated by dividing the rootstock."

Two years later the following note appeared with the second publication of the species: "On the banks of the Mississippi near New Orleans; discovered by Mr. Enslen, Collector to the Prince Lichtenstein of Austria."

The original localities have doubtless been destroyed by the extensive engineering work along the lower Mississippi, but, fortunately, the species has a fairly wide geographic distribution. It extends from the Coastal Plain of the lower Mississippi Valley into the adjacent provinces. In mid-spring it is still a gorgeous sight in the vicinity of the city of New Orleans, especially toward Lake Pontchartrain, growing in large and small colonies according to the proper relation of the water-table to the habitat. The colonies occupying spots with the best-suited amount of water flower profusely. Sometimes in marshy places it occurs in pure growths, and here it shows up to the best advantage; sometimes it grows in thickets or

in company with spiderlilies (*Hymenocallis*) whose immaculate flowers emphasize the red of the flag.

En masse, the flowers of the typical form of the species, as here represented, make a blaze of color, for they are elevated above the foliage and are not intimately associated with other plants. Occasionally, in the Mississippi Delta, there are colonies with flowers somewhat off color. These, without doubt, are of hybrid origin.

The ancestry of the red-flag is obscure. The present plant scarcely could have originated in the rather recently formed Mississippi River Coastal Plain. So, we may assume that the ancestors migrated from the ancient highlands, and as the migration was in progress, for some reason or reasons, became extinct as the vanguard advanced.

The red-flag has a stoutish widely spreading rootstock with scars or fibers of decayed leaves. The leaves are erect, usually two or three together. The blades are linear-attenuate, rather narrowly so, up to a yard long, deep-green and with very narrow pale margins. The flower-stalk is erect, rather slender, often overtopping the leaves, slightly zigzag. The flowers are solitary or paired at the top of the stem and often in the axils of one or two stem-leaves. The involucre has two main bracts, the longer one attenuate and exceeding the flower. The pedicel is longer than the ovary at anthesis. The hypanthium covering the ovary is sharply six-angled. The perianth-tube is subcylindric-prismatic or slightly funnelform, longer than the ovary at anthesis. The three sepals are red or copper-colored, spreading-arching, one and three quarters to two and a quarter inches long. The blade is very short, paler than the blade, with a median pale line. The blade is oval or oval-obovate, deeper-colored in the center than about the edges, finely veined with darker red, usually notched at the tip. The three petals are about two thirds as long as the sepals and colored like them, narrow-obovate or elliptic-obovate and more or less cuneate at the base, usually notched at the apex. The three stamens are about three quarters of an inch long, more or less tinged with red, with the anthers slightly longer than the filaments. The three style-branches are broadly linear to linear-elliptic, three quarters of an inch to an inch long, pale brick-red within, yellowish without. The style-appendages are deltoid-ovate, about one sixth of an inch long, erose-toothed, obtuse or merely acute. The stigma is two-lobed. The capsule is ellipsoid or oval, one and three quarters to two and a quarter inches long, green, not beaked but sometimes slightly constricted near the apex, six-angled, rather thick-walled. The seeds, borne in two rows in some capsule-cavities, in one row in others, are brown, corky, circular or half-circular, about a quarter of an inch in diameter, more or less uneven from mutual pressure.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and foliage. Fig. 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Capsule. Figs. 5, 6.—Seeds.

IRIS FLEXICAULIS

(Plate 389)

IRIS FLEXICAULIS

Zigzag Blue-flag

Native of the southcentral United States

Family IRIDACEAE — IRIS Family

Iris flexicaulis Small, sp. nov.

The ratio of blue-flags of the *hexagona* group west and east of the Appalachians stands respectively two to one. The angle-pod blue-flag (*Iris hexagona*), the eastern representative, is a very robust plant, in fact it is our most vigorous iris, and its few flowers are very large and of firm texture. The western representatives, the leafy blue-flag (*Iris foliosa*) and the one here illustrated, are less vigorous vegetatively, as far as rigidity is concerned. In fact the flower-stems are so weak that they promptly bend down or become prostrate, and although the flower-parts are more delicate, an abundance of flowers is produced, as one or two buds arise at each of the several nodes of the very zigzag stem. In contrast with the leafy blue-flag, the nearest relative of the species here illustrated, which produces leaves in abundance and size exceeding those of any of our blue-flags, those of *Iris flexicaulis* are scarcely as large as those of the common blue-flag (*Iris versicolor*). The type specimens, collected along the Nueces River, Texas, by B. C. Tharp, are in the herbarium of The New York Botanical Garden. Plants of the original collection survived two winters in the cold frames at the Garden and the severe winter of 1925–26 in the beds of the iris plantation.

One would be inclined to assume a common ancestor for the species under consideration and *Iris foliosa*. Although they are abundantly distinct from each other in foliage, floral, and fruit characters, they are on the other hand more closely related to each other than to any other species. Among the gross differences, the superabundance of leaves is evident in the case of *Iris foliosa*—whence its specific name—while a superabundance of flowers seems to obtain in *Iris flexicaulis*.

The marsh and swamp, and sometimes the stream-bed, where the stream runs dry part of the year, are the natural haunts of this flag. A dense turf in a marshy slope, a tangle of willow roots and stems, and a soppy floor of a cypress-head are to the liking of this flag as a residence. In all its habitats the bright-violet colored flowers are

conspicuous and they are individually more prominent by the mixture of yellow and white in the sepals. The pods are relatively rather ponderous. They early bend the supporting stalk to the ground, where the usual moisture soon causes the walls to decay and release the corky seeds.

Its exact geographic range, as in the case of most of our interior species, is not yet clear. It might be defined, however, without much chance of error, as the lower Mississippi watershed and the drainage basins of eastern Texas.

The zigzag-flag has a stoutish horizontal branching rootstock which is sometimes partly fibrous with the remains of spent leaves. The leaves are erect, mostly three or five together, pale green and more or less glaucous. The blades are linear-attenuate, mostly one half to three quarters of an inch wide. The flower-stalk is erect, stoutish or slender, shorter than the basal leaves, exceptionally leafy, glaucescent, with several short internodes placed at an angle, thus zigzag. The flowers are paired or three together at the top of the stem or sometimes solitary, and one, or two together, in the axils of the stem-leaves. The involucre has two main bracts, which are exceeded by the flower, not foliaceous. The pedicel is shorter than the ovary. The hypanthium surrounding the ovary is six-angled. The perianth-tube is cylindric-prismatic, nearly or quite a half inch long. The three sepals are broadly spatulate, two and a quarter to two and three quarters inches long, spreading or recurved at the tip. The blade is obovate, deep-violet except near the base, where the yellow-green striae and median crest extend up from the claw and pass into white fleck-like radii. The claw is about as long as the blade, less than a half inch wide, dull-green without, yellow-green, except the dark flecks on and between the ridges, within. The three petals are shorter than the sepals, narrowly spatulate, somewhat spreading. The blade is dull violet without, deep violet within, notched at the apex. The claw is greenish violet without, streaked with violet and brown within. The three stamens are an inch to an inch and an eighth long. The filament is greenish at the base, paler above. The anther is pale yellowish green, shorter than the filament. The three style-branches are two inches long or nearly so, nearly as long as the petals, broadly linear, reddish violet, except the paler margins. The style-appendages are scimitar-shaped, five eighths of an inch long, irregularly and bluntly toothed on one side, mostly so above the middle. The stigma is two-lobed. The capsule is oval or ellipsoid, varying to somewhat obovoid, two to three inches long, drooping, six-angled, pale green and more or less glaucous, with the angles prominent and sharp, the walls very thick. The seeds are borne in two rows in each capsule-cavity, half-circular, brown, corky.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and foliage. Fig. 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Capsule. Fig. 5.—Seed.

IRIS RIVULARIS

(Plate 390)

IRIS RIVULARIS

Sylvan Blue-flag

Native of Florida and Georgia

Family IRIDACEAE — IRIS Family

Iris rivularis Small, sp. nov.

The watersheds of different rivers commonly harbor flags of a single species or endemic plants. The dominating iris of the water-shed of the upper Saint John's River is *Iris carolina* which, however, is not an endemic. Beyond the northern crest of this water-shed, as the land gradually falls off toward the Saint Mary's River and southern Georgia, an iris of a different relationship appears. It occurs in colonies, often very extensive, along streams tributary to the Saint Mary's River. The most thriving colonies grow on the middle ground along the streams in a mixture of sand and clay deposited by the flood waters.

This kind of a habitat has developed a very vigorous plant—one that is very tenacious of life. The roots and rootstocks which store the vitality and form the anchors continue to grow whether washed nearly clean of soil or buried deep in it. The apical growth, with sufficient energy stored in the rootstock to withstand exposure to the air or smothering in the soil, at once adjusts itself to seeking its proper depth in the newly-made level of the habitat.

The home of the early ancestors of this iris evidently was in the highlands. Whatever its ancestors may have been, the plant under consideration reached its present geographic range and status through changes in its structure adapted to changes in elevation, topography, and climate. Before the land was much sculptured, this plant, or its more immediate ancestors, may have occupied vast flat areas, as the prairie blue-flag (*Iris savannarum*) now does in peninsular Florida. Later on when the land rose and streams were formed, gradually cutting more deeply into the surface, our subject retreated to the vicinity of streams, selecting places where the water-table was suited to its demands for moisture.

It grows either on the otherwise barren sandbars with no protection, or closely associated with the thickets of willows, alders, and other many-stemmed shrubs of river shores. When in flower the colonies, with their violet or purple perianths, are equally showy,

whether with the bare sand as a background or the greenery of a thicket. The pods stand erect until maturity when their weight bears down the flower-stem until the fruits lie on the ground, where they gradually decay and allow the seeds to be floated away with the next freshet. The type specimens were collected by the writer along a stream south of the Saint Mary's River on the road from Yulee, Florida, to Kingsland, Georgia. Plants of the original collection survived several winters in the cold frames at the Garden, and the winter of 1925–26 in the beds in the iris plantation.

The sylvan-flag has a rather stout fleshy horizontal rootstock. The leaves are erect, usually two or three together. The blades are linear-attenuate, usually one half to three quarters of an inch wide, bright green. The flower-stalk is one to two feet tall, rather stout, green, often bearing one or two leaves. The flowers are solitary or two together terminating the flower-stalk, and frequently in the axil of the upper leaf. The involucre subtending the flowers has two main bracts, the longer one exceeding the flower, attenuate. The pedicel is one and a half to two inches long, about as long as the hypanthium. The hypanthium surrounding the ovary is three-angled, green. The perianth-tube is narrowly campanulate, bluntly three-angled, at least two thirds as long as the ovary. The three sepals are arching, remate, two and a quarter to two and three quarters inches long. The blade is broadly oval, deep-violet above, with white radii diverging from the green or yellow-green crest which vanishes much below the middle of the blade. The claw is nearly or quite three eighths of an inch wide, light green but striped with deeper green, all shading into the yellow-green at the base of the blade. The three petals are narrowly spatulate, about two inches long; the claw is whitish and finely striate with green veins; the blade is violet but slightly paler than the violet of the sepal-blade. The three stamens are nearly an inch and a quarter long. The filaments are violet-tinged above the base. The anthers are much longer than the filaments. The three style-branches are broadly linear, a little less or little more than an inch and a half long, fully a quarter of an inch wide, green without, lavender-tinged within. The stigma is two-lobed. The style-appendages are lanceolate, nearly or quite a half inch long, pale-violet or lavender, sparingly and coarsely erose. The capsule is oval, varying to somewhat ovoid or obovoid, an inch and a half to two and a half inches long, bright green, slightly beaked, bluntly three-angled, about as long as the pedicel. The seeds, borne in one row in each capsule-cavity, are corky, nearly or quite a half inch in diameter.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and foliage. Fig. 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Capsule. Fig. 5.—Seed.

IRIS SHREVEI

(Plate 391)

IRIS SHREVEI

Interior Blue-flag

Native of the central United States

Family IRIDACEAE — IRIS Family

Iris Shrevei Small, sp. nov.

Blue-flags at or near the western edge of the geographic range of the species typical of the eastern United States should be regarded with suspicion as to true relationships. Preliminary studies have shown that there is very little in common between the *Iris* in the Mississippi River basin and in the Atlantic seaboard. Some of the species today are represented either on the Atlantic seaboard or in the interior, thus indicating that their ancestors in leaving the ancient highlands took either an eastward or a westward course, or if they followed both courses, the complements have been lost. Other species, east and west of the present mountains, are paired, as it were. Although perfectly distinct, they are closely enough related to indicate that they had a common ancestor in later geologic time.

The species here concerned is the complement, as it were, of *Iris versicolor*, just as in another group, *Iris foliosa* is the complement of *I. hexagona* On the other hand, *Iris vinicolor* of the Mississippi Delta and *Iris fulva* wide-spread in the interior have no complementary representatives in the Atlantic Coastal Plain.

The marsh is the home of *Iris Shrevei*. Large level stretches are often densely covered by the bright green plants with their numerous flower-stalks which hold the showy flowers about level with the tops of the leaves at anthesis. After the flowering season, as the pods mature, the stalk bends at the ground, lies down, and carries the pods to the turf where they lie, mature, and spill their corky seeds which lie ready to be floated away when high water comes.

The plants often grow in a dense turf of grasses, sedges, and rushes. Water-horehounds (*Lycopus*), mints (*Mentha*), and bonesets (*Eupatorium*) are often associated with them, while woody plants—roses (*Rosa setigera*), cornels (*Svida obliqua*), and buttonbushes (*Cephalanthus occidentalis*)—afford partial shade. The color of the flower is mainly lavender, in pale and dark shades. There are occasionally colonies with lavender-blue flowers, and rarely the

perianth-parts are almost white. Contrary to what obtains in most of our blue-flags, the flowers are decidedly sweet-scented. The amount of fragrance, however, varies with the different colonies and localities. The type specimens were collected by Ralph Shreve near Farmington, Arkansas, and are in the herbarium of The New York Botanical Garden. The plants of the original collection are hardy in the iris plantation of the Garden.

The interior blue-flag has a stout, often branching, fleshy, widely creeping rootstock. The leaves are erect, usually two or three together, bright green and frequently somewhat glaucous except the often purple bases. The blades are linear-attenuate, up to a yard long, mostly three quarters of an inch to an inch wide. The flower-stalk is erect, about equaling the longer leaves in anthesis, much shorter later in the season, with one or two branches which usually nearly or quite equal the top of the main stem at maturity. The flowers are solitary, paired, or three together at the end of the stem, and often solitary or paired in the upper one or two leaf-axils. The involucre consists of two main short bracts which sometimes reach only to the base of the hypanthium. The pedicel is usually about as long as or slightly longer than the ovary in anthesis. The hypanthium surrounding the ovary is bluntly three-angled. The perianth-tube is turgid-campanulate, much shorter than the ovary, usually about half as long. The three sepals are remate, two to two and a half inches long, recurved-spreading. The blade, which is about as long as the claw or shorter, is oval, or orbicular-oval, mainly lavender or lavender-blue, except the yellow-green blotch near the base, from which white flecks bordered by purple lines diverge. The claw is rather broad, bright green and flecked with purple without, yellowish green and lined with purple within. The three petals are spatulate, nearly as long as the sepals. The claw is green or greenish-yellow, flecked and lined with purple near the base as in the sepal-claw. The blade is light violet, faintly lined with dark violet. The three stamens are about one and a quarter inches long. The filament, with the dilated lower part yellowish green, is whitish above. The anthers are greenish yellow, shorter than the filaments. The three style-branches are about an inch and a half long, pale lilac or pale lavender. The style-appendages are obliquely lanceolate or ovate-lanceolate, one third to one half inch long, curved upward, coarsely few-toothed. The stigma is entire. The capsule is prismatic-cylindric, two and a half to four inches long, three-sided, usually longer than the pedicel, the angles rounded, the sides with an impressed rib which is three-forked above the middle. The seeds, borne in two rows in each capsule-cavity, are half-circular, corky, brown, often nearly or quite a half inch in diameter.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and foliage. Fig. 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Capsule. Fig. 5.—Seed.

IRIS PRISMATICA

(Plate 392)

IRIS PRISMATICA

Slender Blue-flag

Native of eastern North America

Family IRIDACEAE — IRIS Family

Iris prismatica Pursh, Fl. Am. Sept. 30. 1814.
Iris gracilis Bigel. Fl. Bost. 12. 1814.

The great antiquity of the slender blue-flag is definitely recorded by its geographic range—which includes all three plant-provinces eastward from the highlands, viz. the Blue Ridge, the Piedmont, and the Coastal Plain. The ancestors of this flag preserved in the highland retreats during the submergences of later geologic times sent their descendents through the Piedmont clear to the coast. At the same time it held its own in the Blue Ridge, and today it may be found either in the marshes in the coastal region, or at several thousand feet altitude in the mountains.

This dainty plant is one of the most desirable of our native irises for cultivation. It forms large clumps or extensive colonies; its underground parts, especially the long rootstocks, and slender scaly stems, are firm in texture.

There are no striking characters in the flowers to distinguish them from the flowers of our other blue-flags, but the fruit is characteristic: the half-ripe pod is short and broad with little body and flat wings, but as it matures the body lengthens, becomes relatively narrow, the wings disappear, and a narrow three-angled prismatic capsule is evolved. This opens by three short valves at the summit and allows the numerous seeds to be shaken out as it bobbs about in the wind on the slender stems. The numerous seeds and the virile rootstocks are strong arguments against it having once migrated to other regions than it now occupies and then become extinct there.

In the Coastal Plain the slender blue-flag grows in the turf of bogs, often about cranberry bogs, of the pine barrens. Here its flowers are elevated above the usually depressed associated vegetation. In the mountains, its ancient home, the slender blue-flag occurs in swampy places in the flat valleys which are often submerged by slow-flowing streams during flood periods. Here there is often a peculiar association of northern and southern plants—sweet-gale (*Myrica Gale*) and bamboo-vine (*Smilax laurifolia*) grow side by side. The

mountain bog-asphodel (*Abama montana*) is associated with the pitcher-plant (*Sarracenia rubra*), the leather-leaf (*Chamaedaphne calyculata*), the Appalachian cherry (*Prunus cuneata*), and two other blue-flags (*Iris carolina* and *I. versicolor*).

The specimens from which the accompanying painting was made were collected at Apple-pie Hill, Burlington County, New Jersey, only a few miles north of Egg Harbor, cited by Pursh as the locality from which the original specimens came. In latitude the species ranges from Georgia to Nova Scotia.

The slender blue-flag has a slender, widely creeping somewhat scaly rootstock. The leaves are erect, "grass-like," two or three together. The blades are very narrowly linear, mostly less than a quarter inch wide, bright green, slenderly attenuate. The flower-stalk is slender, wiry, usually one to two and a half feet tall. The flowers are usually two or three together, arising from a narrow involucre of nearly equal bracts at the top of the stem, long-pedicelled, and often one terminating one or two slender branches. The pedicel is slender, several times as long as the ovary and exceeding the bracts, inequilateral, raising the flower above the bracts. The hypanthium surrounding the ovary is three-sided and sharply three-angled, green. The perianth-tube is short, campanulate, about half as long as the ovary. The three sepals are recurved-spreading, an inch and a quarter to an inch and three quarters long, narrowly pandurate. The blade is broadly rounded, with a white background, yellow-tinged at the base and veined and flecked with blue which merges about the edges. The claw is broad, longer than the blade, magenta-striped at the base, yellowish green at the middle with a rib but no crest, whiter on the edges and with purple veins. The three petals are spatulate, about one and a half inches long, often nearly as long as the sepals, the narrow inrolled claw veined with magenta, the longer blade pale blue with deeper-colored veins. The three stamens are fully three quarters of an inch long, with a filament and anther about equal in length, the filament, and usually the anther, also magenta-tinged. The style-branches are usually less than an inch long, linear-cuneate, magenta, deeper-colored within. The style-appendages are obliquely ovate, about a quarter of an inch long, angular-toothed. The stigma is entire, sparingly erose at the tip. The capsule is narrowly prismatic-cylindric, one to two inches long, rather sharply three-angled, thin-walled, shorter than the slender pedicels, three-valved at the apex. The seeds, in one row in each capsule-cavity, are circular, or through mutual pressure sometimes half-circular, about one sixth of an inch in diameter, brown, scarcely corky, somewhat shining.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Base of plant, showing rootstock. Fig. 2.—Inflorescence and foliage. Fig. 3.—Capsule, unopened. Fig. 4.—Capsule, open. Figs. 5, 6.—Seeds.

MELIA AZEDARACH

(Plate 393)

MELIA AZEDARACH

China-berry

Native of China and Persia

Family MELIACEAE — MAHOGANY Family

Melia Azedarach L. Sp. Pl. 384. 1753.

It is spring in the southland—a strong honey scent fills the air, delightful in its fragrance. Seek for its source and you find, not one of the native spring flowers, but a beautiful tree, its growth reminding one much of an umbrella. The odor is seen to come from sprays of lilac-colored flowers thickly set throughout the branches, many of them even hidden in its great mass of somewhat fernlike foliage.

When the berries are ripened, then the tree is enjoyed by the children, who gather great quantities of them, and by stewing off the pulp, obtain the hard bony pits, which they color and string into necklaces by means of the natural perforation thru the center of the stone, which though small is easily enlarged with a heavy needle. This same fact is taken advantage of by the monks of some of the European monasteries, who use the pits to make their rosaries, whence the name bead-tree, by which the plant is sometimes called.

The bark of the tree is used medicinally for its cathartic and emetic properties; it is also used as an anthelmintic. The tree must also possess narcotic properties, for birds eating too freely of the berries have been made insensible for a few hours.

The wood is sometimes used for furniture, for which purpose it could be made more use of, as it is hard and durable, and resembles mahogany in some ways, so that it is sometimes substituted for mahogany, as are other members of the same family, as *Cedrela* and *Khaya*. It is a rapidly growing tree, cases being known of trees only nine or ten years old, with trunks up to sixteen or more inches in diameter.

The name *Melia* is derived from the Greek name for the ash in allusion to some fancied resemblance of the leaves of *Melia* to those of the ash; the word *Melia* being derived from the Greek word for honey, referring to the sweet sap of the ash tree.

The tree has been in cultivation so long and has become so popular on account of its beauty that it has been grown and become naturalized in warm countries almost throughout the world. It is

supposedly native to Persia and China, and probably so in Baluchistan and parts of Kashmir. In the United States it has become naturalized from North Carolina west to California and south to Florida and Texas except in the mountain regions and their neighboring sections. Something of its widespread nature may be shown by its collection of names such as China-berry, China-tree, Bead-tree, Pride of India, Bukhain, Persian lilac, Umbrella-tree, Paternosterbaum, Holy-tree.

The China-berry is a deciduous tree, not exceeding forty feet in height, with a trunk up to two feet in diameter, and a rounded, spreading top, often umbrella-like, the trunk clothed with a reddish-gray bark, thin and much furrowed, the branches clothed with a smooth reddish brown bark. The sapwood is yellowish, the heartwood light-red, the annual growth rings marked by rather large cells. The leaves are alternate, bright green, approximate near the ends of the branches, eight to eighteen inches long, rarely longer, and from four to twelve inches broad, twice pinnate, with four to eight pairs of usually opposite pinnae. The leaflets are ovate-lanceolate and deeply serrate, the teeth rounded or acute. The flowers, borne in the leaf axils in branching panicles, are lilac-colored, with a violet-colored staminal tube, and very fragrant. They are about one half inch long. The calyx is composed of five ovate, pubescent sepals about one twelfth inch long. The corolla is composed of five lanceolate petals, slightly pubescent on the outside. The staminal tube is about one third of an inch long, ten-or twelve-lobed, each lobe with two or three teeth at the top, thus forming a fringe. The ten or twelve yellow anthers, nearly as long as the teeth, are borne on the inside of the tube near the top. The stigma is clavate and five- or six-lobed. The style is thick, slightly shorter than the staminal tube. The ovary is five- or six-celled, slightly thicker than the style. The fruit is an ovoid or globose yellow drupe, with an ill-smelling pulp, and a prominently five- or six-ribbed stone, containing a seed within each rib. The drupes become wrinkled when thoroughly ripe, and persist on the otherwise bare tree all winter.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. **Fig. 1.—Leaf and inflorescence. Fig. 2.—Staminal** tube, split open, showing pistil, × 2. **Fig. 3.—Fruit. Fig. 4.—Stone, end view. Fig. 5.—Stone, side view.**

ARTHROPODIUM CIRRHATUM

(Plate 394)

ARTHROPODIUM CIRRHATUM

Rock-lily

Native of New Zealand

Family LILIACEAE — LILY Family

Anthericum cirrhatum Forst. Prodr. 148. 1786.
Arthropodium cirrhatum R. Br. Bot. Mag. *pl. 2350.* 1822.

The iris and lily relatives of the Antipodes are to the conservatory what the Cape bulbs are to our midsummer gardens. In the cool greenhouse they are decorative herbs of simple culture, adapted for natural plantings along paths, pools and around the base of large plants. The rock-lily is related to the New Zealand flax, *Phormium tenax*, which furnishes fiber of great value. This plant grows with the famous "wedding iris" of Australia on the edges of the pool in the Central Display House, Conservatory Range No. 2. Other closely related plants in the same conservatory are *Dianella*, and the ti-plant, *Cordyline australis*.

Propagation is by division. The plants are potted up in early spring in ordinary good garden soil, or planted directly in the ground. They bloom very freely, usually in the months of April and May.

The plants furnishing material for our illustration were grown from seed sent from Palmerston, Northern New Zealand, by Mr. J. W. Poynton.

The rock-lily is a tufted glabrous herb from fleshy, fibrous roots, with shiny grass-like linear-lanceolate leaves up to two feet long, and one and one half inches wide, with long-acuminate apices. The flowers are in large branching panicles, leafy-bracted below. They are about one inch in diameter, on short slender pedicels which are jointed in the middle. The white, spreading perianth-segments are six in number, the three inner being oblong, broadly lanceolate, acute, the three outer narrowly lanceolate. The six stamens are arranged in a close ring in the center of the flower. The anthers are lanceolate and erect; just beneath them the filaments are purple, woolly, thickened and bear curious woolly yellow appendages which are curved at the tips. The ovary is three-celled, the cells with many ovules, the style slender and the stigma small. The capsule is rounded, three-celled, and at maturity contains many angular black seeds.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Top of inflorescence. Fig. 2.—Summit of leaf. Fig. 3.—Flower, with perianth and stamens (except one) removed, × 2. Fig. 4.—Stamen, × 3. Fig. 5.—Tip of stamen, × 6. Fig. 6.—Fruit.

SABINEA PUNICEA

(Plate 395)

SABINEA PUNICEA

Caracolillo

Native of Porto Rico

Family FABACEAE — PEA Family

Sabinea punicea Urban, Symb. Ant. 1: 323. 1899.

The genus *Sabinea*, established by de Candolle in 1825, in honor of Joseph Sabine, an English botanist, consists of three known species, all West Indian. These are (1) the type species, *S. florida* (Vahl) DC., growing in Porto Rico and the Virgin Islands, first described by Vahl in 1793 as *Robinia florida;* (2) *S. carinalis* Griseb., known only from the island of Dominica; and (3) *S. punicea* Urban, known only from central and western Porto Rico, here described and illustrated. They are shrubs or small trees, with equally pinnate leaves, the small, short-stalked leaflets entire-margined, the pink, lavender, rose or carmine flowers solitary or clustered, in structure much like those of the northern locusts (*Robinia*). The thin calyx is nearly truncate. The corolla is composed of a broad standard, two oblong, somewhat curved wings, and a blunt, inflexed keel. There are ten stamens, nine of them united by their filaments into a sheath, the other one separate; the anthers of all ten stamens are alike. The ovary is stalked and contains many ovules, the style very slender, the small stigma terminal. The fruit is a narrow legume, its thin valves twisting when ripe and releasing the flattened seeds.

Sabinea punicea is a shrub, sometimes six feet high, with more or less hairy young twigs; its leaves are from two to four inches long, the petiole short, the leaflets from five to ten pairs, firm in texture, oblong to obovate, about half an inch long, reticulate-veined, blunt at both ends or the apex notched; the pink to carmine flowers are usually clustered on slender stalks mostly less than an inch long; the bell-shaped oblique calyx is about a quarter of an inch long; the standard is about half an inch wide, the wings up to nearly an inch long; the stamens are all nearly equal in length; the legume is slender, stalked, two and one half to nearly four inches long, about quarter of an inch wide.

The painting here reproduced was made by Mrs. Horne from a shrub growing at Guanajibo, near Mayaguez, Porto Rico, March 17, 1925.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Legume.

ANGELONIA SALICARIAEFOLIA

(Plate 396)

ANGELONIA SALICARIAEFOLIA

Angelon

Native of the West Indies and northern South America

Family SCROPHULARIACEAE FIGWORT Family

Angelonia salicariaefolia Humb. & Bonpl. Pl. Aequin. 2: 92. 1812.

Angelonia is a showy-flowered herbaceous genus of the figwort family, containing some twenty-five species all natives of tropical America, most numerous in Brazil, some of them grown in tropical gardens for ornament under the Spanish name *violeta*, the flowers of some being violet-blue. They have opposite leaves, or the upper ones sometimes alternate; their flowers form terminal racemes, or are solitary in the upper leaf-axils. The calyx is five-cleft or five-parted; the subrotate corolla has a short saccate tube and a widely spreading, irregularly lobed limb; there are four stamens, two longer, two shorter, the anther-sacs divaricate; the ovary contains many ovules. The fruit is a small two-valved capsule, containing several or many foveolate seeds.

The generic name, given by Humboldt and Bonpland in 1812, is a latinized form of Angelon, the common name in Venezuela of the plant here illustrated; this is occasionally cultivated; its natural distribution is in northern South America, Trinidad, Porto Rico, and Santo Domingo. In Porto Rico and in Trinidad we have observed it growing on banks and along roads.

A related species, *Angelonia angustifolia*, is more often seen in tropical gardens, apparently because it responds more readily to cultivation; this differs from *A. salicariaefolia* in having linear leaves and flowers with a slightly different corolla; it grows wild in Mexico, Cuba, Jamaica, Santo Domingo, and southern Florida.

Angelonia salicariaefolia is an erect, viscid plant about two feet high, with a simple or branched stem; the lanceolate or linear-oblong leaves are sessile, pointed, toothed, about four inches long or shorter; the flowers are in long terminal racemes with leaf-like lanceolate to ovate bracts; the slender pedicels are nearly as long as the bracts or somewhat longer, and recurved in fruit; the oblique calyx is about a sixth of an inch long, the blue corolla about an inch broad; the nearly globular capsule is about a fourth of an inch in diameter.

Mrs. Horne's painting, here reproduced, was made from a plant obtained by her between Mayaguez and Maricao, Porto Rico, May 19, 1925.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Raceme of flowers. Fig. 2.—Leaves and fruit.

QUERCUS SERRATA

(Plate 397)

QUERCUS SERRATA

Serrate-leaved Oak

Native of eastern and southern Asia

Family FAGACEAE — BEECH Family

Quercus serrata Thunb. Fl. Jap. 176. 1784.

This tree is native in eastern and southeastern Asia, where it is one of the most widely distributed deciduous-leaved oaks of the region, ranging from the coastal foothills of Japan to the Indian Himalayas. In Japan it is stated to be a characteristic and prominent second-growth tree in waste lands, where it apparently springs up in great numbers. It is said to be valued only for the charcoal which is made from it, although it forms a handsome, ornamental tree in cultivation, and it has been introduced and successfully grown, with this object in view, in the eastern United States.

The specimen from which the illustration was made was collected from a tree growing in the arboretum of the New York Botanical Garden. This tree is one of four fine specimens which came as young trees from Biltmore, South Carolina, in 1903. Two of these have borne acorns for three consecutive years. Two other thriving examples of this oak are in our collection, received from the Bureau of Plant Industry, Washington, D. C., in 1906.

The serrate-leaved oak is a small tree, twenty to forty feet in height, with a black-barked trunk and coarsely serrate-dentate, oblong-acute, dark green, shining leaves that closely resemble those of the chestnut. Each of the foliar dentitions terminates in a long slender awn, thus indicating relationship with the eastern North American group of lobate-leaved oaks with bristle tipped foliar lobes, to which our common red, black, and swamp or pin oak belong, rather than with the awnless lobate-dentate and coarsely dentate leaved group which includes the scrub-chestnut or chinquapin oak, and the rock-chestnut oak; although the general type of leaf-form characteristic of the two species last mentioned is more nearly comparable with that of *Quercus serrata*. The acorns are relatively small and the cups are covered with long, acuminate, reflexed and more or less twisted or contorted, scurfy scales.

ARTHUR HOLLICK.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Staminate flower, × 4. Fig. 3.—Pistillate flower, × 4. Fig. 4.—Fruiting branch.

PLATE 398

ADDISONIA

ASARUM CANADENSE

(Plate 398)

ASARUM CANADENSE

Wild Ginger

Native of eastern North America

Family ARISTOLOCHIACEAE — BIRTHWORT Family

Asarum canadense L. Sp. Pl. 442. 1753.

Unless acquainted with the wild ginger in its natural haunts one might easily overlook its peculiar flowers, which grow close to the ground on short slender pedicels arising from between the bases of the petioles and concealed under fallen and partly decayed leaves. This species grows naturally in rich woodlands from New Brunswick to Manitoba, south to North Carolina, Missouri, and Kansas. It is quite common in the vicinity of New York City, where it is often found in company with its near relative *Asarum reflexum* Bicknell, from which it differs in its ovate-lanceolate calyx-segments. It is easily transplanted and grows well in rich soil in shady places. The brown or greenish-brown rootstocks when broken or bruised have a rather strong odor of ginger.

The plant from which the accompanying illustration was made was collected at McLean Heights, Yonkers, New York, by Miss Mary E. Eaton, in the spring of 1926.

The wild ginger is a stemless perennial herb, with slender aromatic branched rootstock. The finely pubescent erect leaf-stalks are five to eleven inches long, the thin dark green leaf-blades are three and one half to seven inches broad, reniform, short-acuminate at the apex and deeply cordate at the base. The flowers are one inch or more in diameter, the calyx ovoid, its tube adnate to the ovary, its ovate-lanceolate long-acuminate lobes inflexed in the bud. The twelve stamens are inserted on the ovary; the short filaments are longer than the anthers. The coriaceous capsule is crowned by the withering-persistent calyx and stamens.

PERCY WILSON.

EXPLANATION OF PLATE. Fig. 1.—Flowering plant. Fig. 2.—Flower, cut open. Fig. 3.—Stamen, exterior view, × 2. Fig. 4.—Stamen, interior view, ×3. Fig. 5.—Gynoecium, ×3. Fig. 6.—Fruit.

ZANTEDESCHIA AETHIOPICA

(Plate 399)

ZANTEDESCHIA AETHIOPICA

Calla

Native of South Africa

Family ARACEAE — ARUM Family

Calla aethiopica L. Sp. Pl. 968. 1753.
Richardia africana Kunth, Mém. Mus. Par. 4: 433. 1818.
Zantedeschia aethiopica Spreng. Syst. 3: 765. 1826.

In swamps or places wet during the winter the white arum of the Cape of Good Hope region is common and the roots are eaten by pigs. While a broad landscape studded with the waxy white bloom of calla is familiar there, to Americans the flower is that of a common house-plant or florist's product. In California it is a beautiful and useful garden subject. It has been cultivated for two hundred years. About thirty years ago *Z. Elliottiana*, with rich golden yellow spathes, was introduced, and now we have a species with white-spotted leaves in our collection; *Z. Rehmannii*, with pink spathes, is also sparingly grown.

The genus name *Calla* being restricted to the cold swamp *Calla palustris*, and that of *Richardia* belonging to an earlier genus, the present one, after Zantedeschi, an Italian botanist, is used.

The calla is easy to grow if furnished with plenty of plant food. It should be rested, by turning the plant on its side in June and letting it remain there unwatered until August or September. The plant should then be turned out and repotted in fresh and very rich compost. Although the calla blooms more quickly in a small pot, both foliage and flower are much finer in a large pot. For a good-sized three- or four-year plant, a ten- or twelve-inch pot is preferable. Place a two-inch layer of charcoal in the bottom; over this a layer of well-rotted manure, then the regular compost. Water lightly until growth really begins, then too much can hardly be given, and the warmer it is the better. The calla can scarcely be fed too much, so rich liquid manure should be given once or twice a week while it is growing. The spotted calla is strictly a summer plant, and requires to be kept dormant in winter.

The calla is a perennial herb from a thick tuber. The leaves are smooth, their petioles long, thick, and spongy, their blades about twice as long as broad, with cordate-sagittate bases and cuspidate apices. The flowers are produced on smooth thick peduncles about as long as the petioles of the leaves. The flowers are on rather stout spadices, surrounded by waxy white trumpet-shaped spathes; the

staminate flowers on the upper part of the spadix, the pistillate on the lower, and occasionally surrounded by staminodes. After flowering the upper part of the spadix dies, the fruits develop, the spathe turning greenish and enclosing the berries which are yellow when ripe.

KENNETH R. BOYNTON,
HENRY W. BECKER.

EXPLANATION OF PLATE. Fig. 1.—Summit of petiole, with leaf-blade. Fig. 2.—Inflorescence.

DUDLEYA ALBIFLORA

(Plate 400)

DUDLEYA ALBIFLORA

White-flowered Dudleya

Native of Lower California

Family CRASSULACEAE — ORPINE Family

Dudleya albiflora Rose, Bull. N. Y. Bot. Gard. 3: 13. 1903.

Although more than sixty species of *Dudleya* have been described, only one is known to have white flowers and for that reason was named *Dudleya albiflora*. It was first collected by T. S. Brandegee about Magdalena Bay, Lower California, and flowered first at the New York Botanical Garden in 1903. It was collected again by J. N. Rose at the type locality in 1911. More recently it was obtained by Ivan M. Johnston while connected with the scientific expedition sent by the California Academy of Sciences in 1921 to explore the islands in the Gulf of California. Living specimens first went to Washington and from there a plant was sent to the New York Botanical Garden where it flowered April 24, 1922, and again in 1923, and from this source our illustration was drawn.

Of the fifteen species of *Dudleya* described from Lower California, only a few have been in cultivation. Those which have been grown in greenhouses do well for a time, sooner or later flower, and then die.

It is interesting that no species of this genus, though it is so well distributed in Lower California, have yet been found on the mainland of Mexico.

The white-flowered dudleya is acaulescent, crowned by an open rosette of about twenty spreading leaves; these are fleshy, bright green or sometimes tinged with red, the longest about two and a half inches long, half an inch broad and pointed; the flowering stem is weak, one and onehalf feet long, red, bearing small scattered bright red bract-like leaves; the inflorescence is a few-branched raceme; the flowering stalk is about a foot long, slender, bright red and bearing many small alternate bracts; the inflorescence is made up of three or four weak branches or secund racemes; the pedicels are very short, sometimes barely a twelfth of an inch long; the five sepals are ovate and acute; the petals are erect except at the tip and are about half an inch long.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Base of flowering stem, with leaf-rosette. Fig. 2.—Summit of flowering stem.

STAHLIA MONOSPERMA

(Plate 401)

STAHLIA MONOSPERMA

Cobana negra

Native of Porto Rico

Family CAESALPINIACEAE — SENNA Family

Caesalpinia monosperma Tul. Arch. Mus. Nat. Paris 4: 148. 1844.
Stahlia maritima Bello, Anal. Soc. Esp. Hist. Nat. 10: 255. 1881.
Stahlia monosperma Urban, Symb. Ant. 2: 285. 1900.

Restricted in distribution, so far as known, to a few colonies near the coasts of Porto Rico and its neighboring island dependency Vieques, *Stahlia monosperma* is one of the rarest and most interesting of all trees, highly valued for its black, heavy, durable wood. The trees grow mainly along and near the borders of mangrove swamps, a little above the highest reached by tidal influence, but occasionally they are to be seen further inland. Perhaps the largest colony is on a subsaline plain near Boqueron in southwestern Porto Rico; here many trees were to be seen in the spring of 1927; most of them had been cut for timber, but they had made numerous shoots from the cut stumps, some of these twenty feet high, the tree having this habit in a noteworthy degree.

This is the only known species of *Stahlia*, a monotypic genus, which commemorates Augustin Stahl, a doctor of medicine, who resided and practiced at Bayamon, Porto Rico, from 1865 to his death in 1917; he made extensive collections in botany, zoology and archaeology, and published a book, now very rare, entitled "Estudios sobre la flora de Puerto Rico." The genus was established by the Spanish botanical author Bello in 1881, when it was first distinguished from *Caesalpinia*.

Mrs. Horne's painting, the first illustration in color of this rare species, was made from trees on the eastern coast of Porto Rico near Ceiba, on March 3, 1927, the flowering spray from a group at Bahia Puerco, the fruit from the colony at Ensenada Hunda.

Stahlia monosperma is an unarmed tree, with maximum height of about sixty feet and trunk diameter of nearly three feet, the twigs and leaves smooth. The alternate, pinnate leaves have from three to six pairs of ovate or ovate-lanceolate pointed leaflets from two to four inches long, characteristically provided with round black glands on the under side, the upper surface shining. The flowers are clustered in hairy racemes from three to six inches long, and borne on short stalks. The five ovate, ciliate sepals are united at the base, blunt, about one quarter of an inch long. The five nearly equal petals are elliptic and from a third to a half inch long, reflexed,

cream-colored, tinged with pink, and finely glandular-papillose. The seven to ten stamens are separate, about as long as the petals, woolly below with pink hairs, their dark red anthers versatile. The ovary and style are smooth. The fruit is an ovoid or nearly orbicular flat, indehiscent, or perhaps tardily dehiscent pod, about an inch broad, leathery and purple, containing only one seed.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch. Fig. 2.—The fruit.

EXOGONIUM ARENARIUM

(Plate 402)

EXOGONIUM ARENARIUM

Cambustera

Native of the northeastern West Indies

Family CONVOLVULACEAE MORNING-GLORY Family

Exogonium arenarium Choisy, Conv. Rar. 129. 1838.
Ipomoea arenaria Steud. Nom. 815. 1840.
Ipomoea Eggersiana Peter, in E. & P. Nat. Pfl. 4[5a]: 30. 1899.
Ipomoea Steudelii Millsp. Field Mus. Bot. 2: 86. 1900.
Exogonium Eggersii House, Bull. Torrey Club 35: 194. 1908.

Among the many kinds of morning-glory vines and their relatives this is one of the most conspicuous and elegant when in bloom. It inhabits the coastal regions of many West Indian islands, ranging from St. Martin and Anguilla westward through the Virgin Islands to Porto Rico and Hispaniola, often growing abundantly in thickets, twining on bushes or low trees, even on cacti, or trailing on the ground, attaining a length of from three to more than twelve feet and often flowering profusely.

The vine is very interesting from the wide diversity of its small leaves and the remarkable range in color of its flowers, from crimson to pink, purple, lilac, or even white. The genus *Exogonium* differs from the true morning-glories (*Ipomoea*) by a salverform corolla and exserted stamens, in these features resembling the cypress-vines (*Quamoclit*), but these have a four-celled ovary, while that of *Exogonium* is three-celled.

Our plate is reproduced from a painting of a plant found near Salinas de Guanica, on the southern coast of Porto Rico, December 21, 1925.

Exogonium arenarium is a slender glabrous vine. The leaves are nearly an inch long or shorter, ovate to suborbicular in outline, entire-margined, notched, two-lobed or four-lobed, the base cordate or rounded, the lobes ovate to oblong or linear. The flowers are borne one to four together, on short, stout stalks. The broadly ovate sepals are about a quarter of an inch long and rounded. The corolla is about one and a half inches long, its nearly orbicular limb widely spreading, about as broad as the length of the tube, and the style and stamens protude about half an inch. The capsule is pointed and about half an inch long or shorter, containing several long-woolly seeds.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Upper part of the vine in flower. Fig. 2.—The fruit. Fig. 3.—A seed.

NIOPA PEREGRINA

(Plate 403)

NIOPA PEREGRINA

Cojobana

Native of the eastern West Indies and northern South America

Family MIMOSACEAE — MIMOSA Family

Mimosa peregrina L. Sp. Pl. 520. 1753.
Acacia peregrina Willd. Sp. Pl. **4**: 1073. 1806.
Acacia Niopa H.B.K. Nov. Gen. 6: 382. 1824.
Acacia angustifolia DC. Prodr. **2**: 470. 1825.
Piptadenia peregrina Benth. Jour. Bot. Hook. **4**: 340. 1842.
Niopa peregrina Britton & Rose, gen. et comb. nov.

The name *Niopa* was proposed by Bentham in 1875, in the Transactions of the Linnean Society of London, as a section of the genus *Piptadenia*; it was derived from Niopo, the aboriginal name of the species here illustrated, on the upper Orinoco River. The group consists of a few species of unarmed tropical American trees, with bipinnate leaves and small white flowers borne in dense globular stalked clusters; their pods are narrow, elongate, leathery, more or less constricted between the large flat seeds. *Niopa*, considered by us as a genus, with the species here illustrated as typical, differs from *Piptadenia* in having capitate rather than spicate flowers, coriaceous rather than nearly membranous legumes, and orbicular seeds.

Niopa peregrina is a tree with maximum height of about twenty feet, with red-brown, hard, heavy, and durable wood. The nearly black bark is corky and very rough. The twigs and young leaves are puberulent. The stalked leaves are composed of many pairs of pinnae and the petiole bears a large gland; each pinna consists of many pairs of linear, sessile, approximate leaflets about one eighth of an inch long, nearly or quite glabrous when mature. The heads of flowers are half an inch to nearly an inch in diameter, borne on slender, puberulent peduncles. The minute calyx is five-toothed, and there are five small petals. The ten stamens have filiform filaments and small glandless anthers. The pods are linear, from three to seven inches long, about half an inch wide, their coriaceous valves separating when ripe. The seeds are flat, thin, black, and shining, nearly as broad as the width of the pod or smaller.

Mrs. Horne's painting, here reproduced, made in March, 1927, is from a tree at Monteflores, Porto Rico.

N. L. BRITTON,
J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch. Fig. 2.—A legume. Fig. 3.—A seed.

ERYTHRINA CORALLODENDRON

(Plate 404)

ERYTHRINA CORALLODENDRUM

Coral Tree

Native of tropical America

Family FABACEAE — PEA Family

Erythrina Corallodendrum L. Sp. Pl. 706. 1753.

The coral tree or baumortel, called "Piñon espinosa" in Porto Rico, is widely distributed in tropical America, inhabiting relatively dry parts of Jamaica, Cuba, Porto Rico, the Virgin Islands, the Lesser Antilles from St. Kitts south to Tobago, northern South America, and Central America.

It commonly blooms when bare of leaves, and its clusters of large coral-red flowers are very conspicuous. One of its relatives, *Erythrina Poeppigiana*, has already been illustrated in ADDISONIA (Plate 331); from this species, *E. Corallodendrum* differs in the shape of the standard petal of the corolla, this being oval or elliptic in *E. Poeppigiana*, but narrowly oblong and elongate in *E. Corallodendrum*.

Our illustration is from a painting made of material obtained from a tree growing in woods near the road between Ponce and Penuelas, Porto Rico, Feburary 20, 1923.

Erythrina Corallodendrum is a tree with maximum height of about twenty-five feet, its trunk and the stout branches armed with sharp prickles from half an inch to nearly an inch long. The trifoliolate leaves are glabrous, with long and slender, sometimes prickly petioles. The rhombic-ovate or rhombic-orbicular leaflets are pointed and from two to six inches long. The racemes of short-stalked flowers are nearly a foot long or shorter. The narrowly bell-shaped calyx is truncate and from a quarter to half an inch long. The standard petal is narrowly oblong, folded, about two inches long, much longer than the keel and wing petals. The stamens are shorter than the standard. The narrow, transversely constricted pod is from four to six inches long and about half an inch wide. The scarlet seeds usually have a black spot.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—A leaf. Fig. 2.—A flowering twig. Fig. 3.—A legume. Fig. 4.—A seed.

CHAMAEFISTULA ANTILLANA

(Plate 405)

CHAMAEFISTULA ANTILLANA

Hediondilla

Native of Porto Rico, St. Thomas, and Tortola

Family CAESALPINIACEAE — SENNA Family

Chamaefistula antillana Britton & Rose, Sci. Surv. Porto Rico **5**: 369. 1924.

The genus *Chamaefistula* is composed of some thirty species of vines, shrubs, and small trees, natives of tropical America. They have pinnate leaves with two pairs of broad leaflets, and large yellow flowers in terminal clusters, or these sometimes also borne in the upper axils of the leaves. The flowers have five small sepals and five large petals nearly alike in shape and size. The perfect stamens are usually seven in number, with narrow anthers, and there are usually three imperfect ones, called staminodes. The ovary contains many ovules. The pod is elongate, nearly circular in cross-section, leathery in texture, glutinous and pulpy within, and ultimately opens along one side, exposing the transverse, flattened seeds.

The accompanying illustration is from a painting made in January, 1927, from a plant growing in a thicket near Luquillo, Porto Rico.

Chamaefistula antillana inhabits thickets and woodlands at lower and middle elevations in Porto Rico, and on the Virgin Islands St. Thomas and Tortola, presumably occurring also on St. Jan. It is a vine or vine-like shrub, sometimes twenty-five feet in length, with angular branches, the twigs and leaves smooth or finely puberulent. The leaves are stalked, and from three to eight inches long. The leaflets are obliquely ovate or nearly elliptic, pointed, thin in texture, about four inches long or shorter, and there is a small narrow gland between each of the two pairs. The conspicuous and showy clusters of flowers are most abundant in summer and autumn. The oblong or ovate sepals are about one eighth of an inch long. The ovate or nearly orbicular petals are from half an inch to nearly an inch in length. The pods are from three to eight inches long, drooping on slender stalks, about half an inch thick, very glutinous within. The seeds are obliquely oval, flattened, and shining.

N. L. BRITTON,
J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch. Fig. 2.—A legume. Fig. 3.—A seed.

~~SAGITTARIA LANCEOLATA~~

SAGITTARIA LANCIFOLIA

(Plate 406)

SAGITTARIA LANCIFOLIA

Lancehead

Native of tropical and subtropical America

Family ALISMACEAE WATER-PLANTAIN Family

Sagittaria lancifolia L. Syst. ed. 10. 1270. 1759.

The arrowhead family is represented in nearly all parts of the world. However, the genus *Sagittaria*, to which the arrowheads and lanceheads belong, is found chiefly in America.

The name *Sagittaria* refers to the leaf-blade of the European plant, which is shaped like the point of an arrow. This same type of leaf is found in some of the American species, while in others the basal lobes are not represented and the leaf resembles the head of a lance or spear. The genus *Sagittaria* is characterized by its monoecious or dioecious flowers, which are usually borne in whorls of three near the top of the scape. The flowers of the lower whorl are usually pistillate, while those of the upper whorls are staminate. The pistillate flowers have many distinct carpels, which are borne on a convex, spheroidal, or globose receptacle. The rootstocks of some species of *Sagittaria* bear tubers as large as a hen's egg; these were gathered and eaten by the Indian tribes of the United States.

Sagittaria lancifolia grows naturally in marshy places, along the borders of ponds and in ditches from southern United States to Argentina and in the West Indies. The accompanying illustration was made by Mrs. F. W. Horne from a plant growing in a marsh at Santurce, Porto Rico, in January, 1927.

The lancehead is a perennial herb, usually rather stout, and often three feet in height. The leaf-blades, which vary from linear to broadly lanceolate or elliptic, are sometimes a foot or more in length, and acute to acuminate at both ends. The scapes are usually branched and taller than the leaves. The linear-lanceolate or lanceolate bracts are acute to acuminate at the apex and vary from half to one inch in length. The snow-white flowers are usually more than an inch in diameter.

PERCY WILSON.

EXPLANATION OF PLATE. Fig. 1.—A leaf. Fig. 2.—Upper part of the inflorescence. Fig. 3.—Portion of the lower part of the inflorescence.

CANAVALI MARITIMA

(Plate 407)

CANAVALI MARITIMA

Bay Bean

Native of tropical seacoasts

Family FABACEAE — PEA Family

Dolichos maritimus Aubl. Pl. Guian. 2: 765. 1775.
Dolichos obtusifolius Lam. Encycl. 2: 295. 1786.
Dolichos rotundifolius Vahl. Symb. 2: 81. 1794.
Canavalia maritima Thou. Jour. Bot. Desv. 1: 80. 1813.
Canavalia obtusifolia DC. Prodr. 2: 404. 1825.

Canavali is a genus of perennial tropical and subtropical vines, including fifteen species or more, represented in both the New World and the Old. They have trifoliolate leaves, and large white, purple, pink, or red flowers, borne in stalked, axillary racemes. The calyx is two-lipped, the nearly orbicular standard reflexed, the wing-petals twisted or curved, the keel-petals incurved. There are nine stamens united by their filaments, and one separate, or all ten filaments are partly united. The ovary contains several ovules and the style is incurved. The pod is flattened, oblong or broadly linear, its valves separating at maturity. The few or several seeds are white, red, or brown. The generic name is an aboriginal one in the South Sea Islands.

The bay bean, called "Mato de la playa" in Cuba and Porto Rico, inhabits sea beaches and coastal rocks nearly throughout tropical America, extending north to southern Florida and to Bermuda. Our illustration is reproduced from a painting of a vine on the sea-beach at Santurce, Porto Rico, October, 1926.

Canavali maritima is usually a prostrate vine, sometimes fifteen feet long, but occasionally climbs on coastal shrubs, and it usually branches. Its foliage is finely appressed-hairy and somewhat fleshy. The three leaflets vary in shape from nearly orbicular to oval or ob-ovate; they are from one and a half to four inches long, rounded or blunt, the base sometimes broadly wedge-shaped. The clusters of pink flowers are about as long as or longer than the leaves, each flower borne on a spur-like stalk. The helmet-like calyx is more than half an inch long, the corolla sometimes nearly an inch broad. The pod is from four to five inches long and about an inch wide. The seeds are oblong, brown.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—A piece of the vine in flower. Fig. 2.—A legume.

AGALINIS FASCICULATA

(Plate 408)

AGALINIS FASCICULATA

Rough-stemmed Agalinis

Native of the southeastern states and West Indies

Gerardia fasciculata Ell. Bot. S. C. & Ga. 2: 115. 1824.
Gerardia domingensis Spreng. Syst. Veg. 2: 63. 1825.
Agalinis fasciculata Raf. New Fl. Am. 2: 63. 1837.

The rough-stemmed agalinis in habit, in flowers, and in fruit closely resembles the purple agalinis, *Agalinis purpurea* L., so widespread through the eastern United States. The flower is as beautiful as in that species, the corolla as superbly modeled and colored, its purple lobes spreading and the throat exquisitely marked with two yellow lines and deep purple spots. From *A. purpurea* it differs in that the stem is densely beset with short, stiff, wide-based, ascending hairs and that there are clusters of leaves developed in the axils of the main stem-leaves. These leaf-clusters, or fascicles (whence the specific name, "*fasciculata*"), are formed by side branches, each of which grows only far enough to produce a number of leaves. In this way the green, photosynthetic surface of the plant, concerned with the manufacture of starch, is greatly increased with only a slight addition of stem-structure. As compared with *A. purpurea*, our species is a plant of usually poorer soils, bare sand or clay or frequently old fields, rather than low meadows. More than any of our other "purple foxgloves" it springs up in fields abandoned from cultivation, and perhaps this weed-like tendency accounts in part for the plant's singularly irregular distribution. Through Louisiana and lower Texas it is plentiful, and it penetrates inland across Arkansas and Oklahoma to southern Missouri; in Mississippi and Alabama, however, it is present only in the immediate vicinity of the Gulf coast; while eastward through Georgia and South Carolina it occupies the entire width of the Coastal Plain and extends southward to the tip of the Florida peninsula. An outlying station in southeastern Virginia may be due to introduction by human agency, but the dispersion in the West Indies seems more difficult to explain. Here, skipping Cuba, the plant recurs in Hispaniola and Porto Rico. In southern Florida and in the mountains of Santo Domingo more glabrous states are prevalent, in which also the axillary leaf-clusters are smaller and usually shorter than the stem-leaves. Such, indeed, seems to be the condition in the specimen here figured, which is from a hillside between Las

Cruces and Cidra, Porto Rico, where it was painted by Mrs. F. W. Horne, March 29, 1927.

Agalinis fasciculata is an annual herb that tends to blacken in drying. The stem is two to four feet tall, much branched, and usually very scabrous. The leaves are opposite and linear, and are scabrous on the upper surface. In its typical and wide-ranging state, the axillary fascicles are abundantly developed, and usually nearly or quite equal the length of the subtending leaves. The flowers are racemosely disposed, their pedicels being short, only an eighth to a quarter of an inch long. The calyx-lobes are shorter than the calyx-tube, being less than an eighth of an inch long and acuminate. The corolla varies from an inch to an inch and a half long; its lobes are all spreading and the two posterior are loosely pubescent over the entire width of their bases; its color is pink, with two yellow lines and many diffused red-purple spots within the throat on the anterior side. The filaments and anthers are lanose with white hairs, and each anther-cell is acute to nearly cuspidate at base. The capsule is a fifth to a quarter of an inch long and nearly globose. The seeds are minute (rather smaller than in *A. purpurea*), and the seed-coat is marked with black or blackish firm reticulations.

FRANCIS W. PENNELL.

TILLANDSIA TRICOLOR

(Plate 409)

TILLANDSIA TRICOLOR

Three-colored Tillandsia

Native of Mexico

Family BROMELIACEAE PINEAPPLE Family

Tillandsia tricolor Cham. & Schlecht. Linnaea 5: 45. 1831.

The genus *Tillandsia* was established by Linnaeus, and contains considerably more than three hundred species. The species are all native of the Americas, and are found chiefly in the tropics, but a few reach Texas and Florida and one or two as far north as southern Georgia. They are mostly epiphytic plants, growing chiefly in trees, and are usually called air-plants. Some of them are very showy. Many species have been in cultivation, but as a rule they do not survive long under greenhouse conditions.

The plant here illustrated is apparently the specimen obtained by J. N. Rose near Jalapa, Mexico, in 1901 (*no. 6122*). It flowered in Washington several times and was then sent on to the New York Botanical Garden, where it flowered in March, 1927, and at that time our illustration was made. We have referred our plant to *Tillandsia tricolor*, a near relative of *T. fasciculata*. The latter species is a native of the West Indies, but has been found in Florida. Our plant is from eastern Mexico and comes from the type locality of *T. tricolor*.

The three-colored tillandsia has leaves in dense rosettes of twenty to fifty, ensiform, long-acuminate, one and five tenths to two feet long from a broad ovate base two inches broad; the flowering stems are often longer than the leaves, bright red, and surrounded by imbricate bracts. The flowering spikes are four to ten, sessile, two to six inches long, the closely imbricate bractlets green, the tips clothed with white lepidote scales. The lilac petals are nearly two inches long. The filaments are bilobed. The style is a little longer than the filaments.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Habit-sketch of plant, much reduced. Fig. 2.—Top of flowering stem. Fig. 3.—Leaf. Fig. 4.—Sepal. Fig. 5.—Petal. Fig. 6.—Androecium and gynoecium.

RIVINA HUMILIS

(Plate 410)

RIVINA HUMILIS

Bloodberry

Native of tropical and subtropical regions

Family PETIVERIACEAE — POKEWEED Family

Rivina humilis L. Sp. Pl. 121. 1753.
Rivina laevis L. Mant. 41. 1767.
Piercea glabra Mill. Gard. Dict. ed. 8. Piercea No. 1. 1768.
Piercea lomentosa Mill. Gard. Dict. ed. 8. Piercea No. 2. 1768.
Rivina portulaccoides Nutt. Trans. Am. Phil. Soc. 5: 167. 1837.
Rivina viridiflora Bello. Anal. Soc. Esp. Hist. Nat. 12: 105. 1883.

Bloodberry, so called by the natives of the island of Jamaica on account of its red fruit, is widely distributed in Florida, Texas, the West Indies, continental tropical America, and Old World tropics. It is known to the Bahamans as wild tomato. This name, however, is rather misleading, as neither plant nor fruit bears much resemblance to common garden tomato.

Rivina has many relatives scattered throughout the tropics and a few in temperate regions. One of these is the poke or pigeon-berry, which grows abundantly in waste places and along roadsides in many parts of the United States. The young shoots of the poke are eaten like asparagus, while the root is poisonous and is used medicinally.

The scientific name *Rivina* was proposed by Plumier for this genus in 1703 in honor of Augustus Quirinus Rivinus, an author of important botanical works. The accompanying illustration was made by Miss Mary E. Eaton from a plant grown from seed collected in Cuba by Dr. N. L. Britton and Mr. J. F. Cowell in 1911.

Rivina humilis is an erect herb twelve to twenty inches or more in height, sometimes woody at the base. The leaves are alternate. The leaf-blades, which vary from ovate to oblong or lanceolate, are often three to three and one half inches long. They are membranous, and undulate or entire, acute to acuminate at the apex, and narrowed or subtruncate at the base. The slender petioles are often an inch or more long. The flowers are small and perfect, and borne on slender pedicels in axillary or terminal racemes four to six inches or more in length. The four oblong-cuneate sepals are erect in fruit, and pinkish, greenish, or purplish. They are less than one tenth of an inch long. The four stamens are shorter than the sepals, the filaments filiform, the anthers cordate at the base. The ovary is one-celled, the short style sometimes curved, the stigma capitate. The drupe-like fruit is red or yellowish and only one fifth of an inch in diameter.

PERCY WILSON.

EXPLANATION OF PLATE. Fig. 1.—Summit of flowering plant. Fig. 2.—Flower, × 4. Fig. 3.—Pistil, × 8.

GAULTHERIA PROCUMBENS

(Plate 411)

GAULTHERIA PROCUMBENS

Wintergreen

Native of northeastern North America

Family ERICACEAE — HEATH Family

Gaultheria procumbens L. Sp. Pl. 395. 1753.

Surely everyone in the eastern United States is familiar with wintergreen, either by odor or from a knowledge of the plant itself. How many times have we gone into the woods in early winter or spring to gather the berries to eat for their spicy, aromatic flavor, or their leaves for tea, or more often, for distilling their oil for application to parts of the body affected with rheumatism or other similar aches and pains.

It is indeed strange that the tiny evergreen shrub here figured should be the storehouse for the same essential oil as that stored in the sweet or black birch (*Betula lenta*), but both alike give up upon distillation an oil similar in all respects except boiling point, the difference there being only a slight one.

Our use of poultices made of the leaves of this plant or of its distilled oil has been handed down to us by the Indians, who put it to a similar use. The berries or the oil are also used as a flavoring agent in candies and chewing gum and to conceal the unpleasant taste of some medicines.

In places where it is plentiful, the berries are sometimes seen in baskets on market-stands; but much more often it is sought out in its native haunts by those who would make use of its tonic properties, or inhale its spicy fragrance. Its berries also furnish a favorite winter food for deer, grouse, and partridge, which often paw or scratch through the snow in search of its crop of dainties. When growing naturally it forms an attractive sight, covering woodland stretches with its carpets of dark green, glossy leaves, sprinkled in winter with the numerous red berries, or in midsummer with its white, barrel-shaped flowers.

The natural range of the plant is from Newfoundland to Manitoba, and south to the mountains of Alabama and Georgia. It is equally at home in all types of woods, though it is said to prefer evergreen ones, and grows in greater profusion in damp rocky places than in dry ones. It would be a desirable plant for an evergreen ground cover where its natural habitat could be imitated, and if undisturbed, propagates freely, both by seed and by its underground stems.

The name *Gaultheria* is in honor of Hugues Gaultier, naturalist and court-physician at Quebec in the middle of the eighteenth century.

Wintergreen is an evergreen, trailing shrub, with its main stem underground, covered with a thin, easily detached, red-brown bark. The upright leafy and flowering branches are from two to six inches tall, pubescent above and usually reddened. The leaves are glabrous except for the midvein above and the petiole, alternate, crowded at the summit of the stem, one to two and a half inches long. The broadly elliptic blades are dark green above, paler beneath, coriaceous, obtuse or acute, serrate with bristle-tipped teeth on the upper half, usually entire below. The flowers are borne one in the axil of each leaf, on slender red, nodding, pubescent pedicels. Each flower is subtended by two broadly ovate, ciliate bracts, which are closely appressed to the calyx and persist in fruit. The calyx is white, consisting of five broadly ovate, ciliate, acute sepals, the lobes longer than the tube; in fruit the calyx becomes enlarged and fleshy, forming the familiar red berry (rarely white), but in the broadly open end the real capsule may be seen. The corolla is white, barrel-shaped, about one quarter of an inch long, slightly pubescent outside, villous within, with five small, reflexed lobes. The androecium consists of ten included stamens fastened at the base of the corolla-tube. The filaments are white and villous, broadened towards the base. The anthers are bright yellow, two-celled, each cell with an apical pore, but extending beyond the pore into two long awn-like bodies. The ovary is glabrous, seated within a ten-lobed disk, five-celled, the ovules numerous in each cell. The style is slender and columnar; the stigma a mere stigmatic tip. The fruit is a depressed five-valved and five-lobed capsule, enclosed within the accrescent hypanthium and calyx, which forms a bright red, subglobose berry three eighths to one half an inch in diameter, which if not picked, persists on the stem until it rots and the seeds are scattered.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Corolla, laid open to show stamens, × 2. Fig. 3.—Stamen, × 4. Fig. 4.—Calyx and gynoecium, × 2. Fig. 5.—Fruiting branch.

JASMINUM HUMILE

(Plate 412)

JASMINUM HUMILE

Italian Jasmine

Himalayan region

Family OLEACEAE — OLIVE Family

Jasminum humile L. Sp. Pl. 7. 1753.
Jasminum revolutum Sims, Bot. Mag. *pl. 1731.* 1815.
Jasminum Wallichianum Lindl. Bot. Reg. 17: *pl. 1409.* 1831.

The jessamine of poetry, the Persian *Jasminum officinale*, represents, with *Jasminum azoricum* from the Canary Isles, and *J. grandiflorum*, the Spanish jasmine, the white-flowered jasmine vines with compound leaves. The ancient Arabian jasmine, *Jasminum Sambac*, is the best known garden form of the simple-leaved white-flowered group. The subject of PLATE 412 typifies the yellow-flowered vines, and our shrub collections contain two species, almost hardy here, *Jasminum nudiflorum* and *J. primulinum*, which produce forsythia-like flowers in late winter or early spring.

The newest garden jasmine is the pink Chinese rosy jasmine. None of these are related to the Cape jasmine, which is *Gardenia*, the boutonniere flower. Our fragrant native *Gelsemium sempervirens* is called Carolina yellow jasmine. The two of most ancient history are those with scented flowers used by the Chinese to flavor tea; Ye-si-min, *Jasminum officinale*, and Mo-li, *Jasminum Sambac*. These were taken to China from Persia and vicinity perhaps before the seventh century.

The Italian jasmine can be cultivated outdoors in subtropical climes, in our southeastern States, and in any cool greenhouse northward. Propagation is effected by means of cuttings or seeds. The common name used here is derived from the first importations of the plant from Italian gardens into England. Tradescant was one of the first gardeners to grow this vine in England. The form with three leaflets was most common, another with five has been long in gardens, and other variations of apparently the same Himalayan species are noted in literature. On one vine grown here one may find three-, five- and seven-divided leaves.

Jasminum humile is a climbing shrub, with angled glabrous branches bearing alternate, compound leaves. The leaflets, on channeled leaf-stalks, are three to seven in number; in the latter case, two in pairs, the first pair smaller, and the terminal leaflet larger still; they are glabrous, generally ovate and short-acuminate, but often of irregular shapes, even aborted; they are from one to two inches long

and from one half to one inch wide. The rich yellow, fragrant flowers are in loose, few-flowered clusters. Each flower is less than one inch long, with smooth, somewhat five-angled and five-lobed calyx, the calyx-lobes short, triangular and ciliate. The corolla-tube is three fourths of an inch long, slightly curved, the oblique limb about one half an inch across, with five spreading imbricate rounded lobes. The two stamens are attached by short flat filaments in the throat of the corolla-tube, and the style is slender, with two lobed stigmas. The fruit consists of two small round jet black berries.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Section of stem, with leaves and flowers. Fig. 2.—Flower, corolla (and stamens) removed, × 2. Fig. 3.—Cluster of fruit.

MALUS MICROMALUS

(Plate 413)

MALUS MICROMALUS

Kaido Apple

Hybrid

Family MALACEAE — APPLE Family

Malus micromalus Mak. Bot. Mag. Tokyo 22: 69. 1908.
Malus speciabilis micromalus Koidz. Consp. Ros. Jap. 89. 1913.
Pyrus micromalus L. H. Bailey, Stand. Cycl. Hort. 2873. 1916.

A great many fruit trees cultivated for their blossoms as well as for fruit are hybrids, and the Kaido apple is such a tree. It is regarded as the hybrid probably of *Malus spectabilis*, the Chinese flowering apple, and *Malus baccata*, the Siberian crab, or possibly *Malus floribunda*, the flowering crab. This fact is suggested in some of the names assigned to this plant by authors who have preferred to consider it as a variety of *M. spectabilis*, which is regarded as most certainly one of the parents. It is distinguished from this prototype by its narrower leaves which taper gradually at the base into a slender petiole, as well as by tomentose pedicels and calices and a subglobose fruit depressed at both base and apex. The calyx may also distinguish this species through its occasional absence on the fruit.

In all events, the Kaido apple originated in China, was introduced into cultivation in Japan, and eventually was brought to this country in 1865. Its red flowers, calices, and pedicels make this tree a very ornamental plant which readily lends itself because of its low stature to compact border planting. An added attraction is that the many little fruits borne by the tree are retained well into the winter or even all winter.

The Kaido apple is a small tree of upright habit, with young branchlets pubescent, soon becoming glabrous. The leaves are elliptic-oblong, acuminate, cuneate, two to five inches long and half as broad, serrulate and pubescent when young, glabrous when mature. The flowers are pink, less than two inches across, with a villous calyx-tube on slightly pubescent pedicels. The fruit is distinguished by a cavity at both base and apex.

EDMUND H. FULLING.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruiting branch.

RHIPSALIS NEVES-ARMONDI

(Plate 414)

RHIPSALIS NEVES-ARMONDII

Neves-Armond's Mistletoe-cactus

Native of eastern Brazil

Family CACTACEAE — CACTUS Family

Rhipsalis Neves-Armondii K. Schumann, in Mart. Fl. Bras. 4²: 284. 1890.

The genus *Rhipsalis* was established by Gaertner in 1788. Taken in its broad sense, *Rhipsalis* differs from most of the other Cactus-genera in the fact that the plants often grow in a moist climate. Indeed, the region in which there are the most species, central Brazil, is one of the wettest parts of the continent. In order to get xerophytic conditions, so essential for most Cacti, they grow chiefly on trees, the bark furnishing an ideal substratum. The genus in the second largest in the Cactus family, being exceeded only by *Opuntia*. More than 160 species and an indefinite number of varieties have been described. Britton & Rose in their restricted treatment of the genus recognize but 57 species. Even in their treatment the genus has a wide variation, especially in its stem-structure. Like the genus *Opuntia* it has two well-marked forms, one in which the stems are terete and the other in which the stems are flattened. The species are most abundant in eastern tropical South America, but extend southward into Argentina and northward into southern Mexico and the West Indies.

The plant here illustrated was sent by P. Campos Porto from Rio de Janeiro, Brazil, and flowered in the New York Botanical Garden in 1923. The painting of the fruit was made in March, 1927.

The stems of Neves-Armond's mistletoe-cactus are slender, elongate, terete, and deep green, the branches are in whorls, usually short. The flowers, borne near the tips of the branches, are white to cream-colored, nearly one inch broad; the petals are widely spreading; the numerous stamens are short; the style is erect; the five stigma-lobes are white; the ovary is sunken in the branch. The fruit is globose, red, one third of an inch in diameter; the seeds are brown.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruiting branch.

VIBURNUM RUFIDULUM

(Plate 415)

VIBURNUM RUFIDULUM

Southern Black Haw

Southeastern United States

Family CAPRIFOLIACEAE HONEYSUCKLE Family

Viburnum rufidulum Raf. Alsog. Am. 56. 1838.
Viburnum prunifolium ferrugineum T. & G. Fl. N. Am. 2: 15. 1841.
Viburnum rufotomentosum Small, Bull. Torrey Club 23: 410. 1896.

There are about thirty species of viburnums in the collections of the New York Botanical Garden, where they may be found in almost every portion of the grounds. The highbush cranberry, *Viburnum Opulus*, is to be seen at its best along the wall adjoining Fordham University, near the Garden's entrance. Along the same walk and in the Fruticetum are excellent specimens, some now 30 years old, of the bright-red-berried Thunberg viburnum. The black haw forms thickets of flowering and fruiting small trees throughout the park, Siebold's species and the Japanese snowball are planted for decoration near bridges and roads, and in the undergrowth of our Hemlock Grove and on the banks of the Bronx river may be found the maple-leaved viburnum and the doublefile viburnum, the latter becoming increasingly prevalent due to the scattering of the seeds by the birds. In the conservatories may be found the laurustinus, the fragrant viburnum, and other species not just hardy in our region. The newer species, about ten, are represented by young plants in our nurseries. A discussion of the genus *Viburnum* will be found in ADDISONIA, volume 4, page 55, and volume 5, page 1; the latter reference being to the beautiful Thunberg viburnum. Several others have been illustrated in this periodical.

The southern black haw varies in cultivation, the brown-tomentose condition of the buds and petioles of the leaves, so noticeable in specimens of plants at home in various states, being present only in the bud-scales and the petioles of the first leaves of the new spring shoots. Petioles of subsequent leaves are smooth, and the leaf-blades vary in shape, the first pair of the shoot being rounded at the apices, the remainder, especially the leaves which mature at fruiting time, longer, narrower, and pointed. A plant of this type, received from the famous Biltmore, North Carolina, collection in 1900, was used for our illustration.

The southern black haw is an upright shrub or small tree, bearing flowers and fruit in broad cymes. The branches are scurfy when

young, often smooth when older. The leaves are opposite, the stalks about one half inch long, the blades obovate to narrowy oval or elliptic in outline, obtuse or at times acute, pubescent or when old nearly glabrous, their margins with shallow teeth, and the petioles winged but not wavy. The flowers are in broad, flat cymes, the flower-stalks pubescent. The corollas are white, about one quarter of an inch across; the stamens long, the anthers prominent. The fruit-stalks are smooth; the fruits blue-black, elliptic or oblong, three fourths to one inch long, on branches and pedicels of bright red color, each fruit containing an ovoid flattened seed.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 2. Fig. 3.—Fruiting branch.

MORAEA IRIDIOIDES

(Plate 416)

MORAEA IRIDIOIDES

Cape White Iris

Native of South Africa

Family IRIDACEAE — IRIS Family

Moraea iridioides L. Mant. 28. 1767.
Moraea catenulata Ker, Bot. Reg. 13: *pl. 1074.* 1827.
Dietes iridioides Sweet, Brit. Fl. Gard. II. *pl. 497.* 1833.
Dietes compressa Klatt, Linnaea 34: 384. 1865.
Dietes catenulata Klatt, Linnaea 34: 585. 1865.

The genus *Moraea* represents the iris of the Southern Hemisphere. In Africa and Australia, where various species are found, the flower is called iris by the settlers, who have at the same time some of the true iris forms in their gardens. The most familiar and beautiful *Moraea* is that called the wedding iris, an Australian flower which grows in company with the New Zealand flax in the Central Display House, Range No. 2, New York Botanical Garden.

The flower closely resembles an iris, and the plant also; the root-stock is slender and short, bearing regularly placed equitant rows of rigid leaves. It is propagated from young plants produced at the end of long slender flowering-shoots, by cutting up the rhizomes, or by seeds which are abundantly formed. Plants may be grown in pots, in under benches, or in greenhouse rockeries, where they thrive as well as the related *Marica*. Many specimens have flowered in the conservatories of the New York Botanical Garden, the illustration herewith presented being made from young plants growing at the Propagating House, derived from seed sent from La Mortola, the famous Italian Riviera garden, in 1924.

The Cape white iris is an herb with short, slender rhizomes and linear leaves and slender rigid flower-scapes. Each rhizome bears six to ten closely appressed equitant leaves in two-ranked rows. The leaves are narrow, semi-rigid, less than one inch wide and a foot or more long. Leaves on the flower-scapes are smaller, clasping and acuminate, the upper scarious, and the bracts below the flowers are cylindric and completely sheathing the stem. The flowers, which are solitary or two or three together, are fugacious, nearly flat, and measure more than two inches across. They are white, with orange-yellow spots on the three larger perianth-segments, and bluish style-branches. The three inner perianth-segments are oval wedge-shaped, about an inch long; the three outer are broadly oval, acuminate, with smaller oval to rounded claws which are sometimes crested and dotted with yellow and brown. The filaments are somewhat united at the base, and each bears a

lance-shaped orange anther. The style is slender, with three petal-like branches, each with a two-lobed crest as in the iris. The capsule is oblong, about one inch long, three-sided, each of three cells containing one row of many closely packed, black, flattened, rounded seeds.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Top of flowering plant. Fig. 2.—Sepal. Fig. 3.—Petal. Fig. 4.—Stamens. Fig. 5.—Gynoecium. Fig. 6.—Pod. Fig. 7.—Seed.

INDEX

Bold-face type is used for the Latin names of plants illustrated; SMALL CAPITALS for Latin names of families illustrated and for the names of the authors of the text; *italics* for other Latin names, including synonyms.

Abama montana, 16
Acacia
    angustifolia, 37
    Niopa, 37
    peregrina, 37
Agalinis, Rough-stemmed, 47
Agalinis
    fasciculata, 47, *plate 408*
    purpurea, 47
ALEXANDER, EDWARD JOHNSTON: *Gaultheria procumbens*, 53; *Melia Azedarach*, 17
ALISMACEAE: *Sagittaria lancifolia, pl. 406*
Angelon, 23
Angelonia, 23
    angustifolia, 23
    salicariaefolia, 23, *plate 396*
Anthericum cirrhatum, 19
Apple,
    Chinese Flowering, 57
    Crab, 57
    Kaido, 57
Apple family, 57
ARACEAE: *Zantedeschia aethiopica, pl. 399*
ARISTOLOCHIACEAE: *Asarum canadense, pl. 398*
Arthropodium
    cirrhatum, 19, *plate 394*
Arum family, 29
Asarum
    canadense, 27, *plate 398*
    reflexum, 27

Baumortel, 39
Bay-Bean, 45
Bead-tree, 17, 18
Bean, Bay, 45
BECKER, HENRY WILLIAM, and BOYNTON, KENNETH ROWLAND: *Zantedeschia aethiopica*, 29
Beech family, 25
Betula lenta, 53
Birch, 53
Birthwort family, 27
Bloodberry, 51
Blue-flag,
    Angle-pod, 9
    Bay, 5
    Common, 9
    Interior, 13
    Leafy, 9
    Prairie, 11
    Slender, 15
    Sylvan, 11
    Zigzag, 9
BOYNTON, KENNETH ROWLAND: *Arthropodium cirrhatum*, 19; *Jasminum humile*, 55; *Moraea iridioides*, 63; *Viburnum rufidulum*, 61
BOYNTON, KENNETH ROWLAND, and BECKER, HENRY WILLIAM: *Zantedeschia aethiopica*, 29
BRITTON, NATHANIEL LORD: *Angelonia salicariaefolia*, 23; *Canavali maritima*, 45; *Erythrina Coralloden-drum*, 39; *Exogonium arenarium*, 35; *Sabinea punicea*, 21; *Stahlia monosperma*, 33
BRITTON, NATHANIEL LORD, and ROSE, JOSEPH NELSON: *Chamaefistula antillana*, 41; *Niopa peregrina*, 37
BROMELIACEAE: *Tillandsia tricolor, pl. 409*
Bukhain, 18

CACTACEAE: *Rhipsalis Neves-Armondii, pl. 414*
Cactus family, 59
Caesalpinia monosperma, 33
CAESALPINIACEAE: *Chamaefistula antillana, pl. 405; Stahlia monosperma, pl. 401*
Calla, 29
Calla
    aethiopica, 29
    palustris, 29
Cambustera, 35
Canavali, 45
    maritima, 45, *plate 407*
Canavalia
    maritima, 45
    obtusifolia, 45
CAPRIFOLIACEAE: *Viburnum rufidulum, pl. 415*
Caracolillo, 21
Cedrela, 17
Cephalanthus occidentalis, 13
Chamaedaphne canaliculata, 16
Chamaefistula, 41
    antillana, 41, *plate 405*
China-berry, 17, 18

China-tree, 18
Cobana negra, 33
Cojobana, 37
CONVOLVULACEAE: *Exogonium arenarium, p. 402*
Coral-tree, 39
Cordyline australis, 19
Crab,
Flowering 57
Siberian, 57
Cranberry, Highbush, 61
CRASSULACEAE: *Dudleya albiflora, pl. 400*

Dianella, 19
Dietes
catenulata, 63
compressa, 63
iridioides, 63
Dolichos
maritimus, 45
obtusifolius, 45
rotundifolius, 45
Dudleya, White-flowered, 31
Dudleya
albiflora, 31, *plate 400*

ERICACEAE: *Gaultheria procumbens, pl. 411*
Erythrina
Corallodendrum, 39, *plate 404*
Poeppigiana, 39
Eupatorium, 13
Exogonium, 35
arenarium, 35, *plate 402*
Eggersii, 35

FABACEAE: *Canavali maritima, pl. 407; Erythrina Corallodendrum, pl. 404; Sabinea punicea, pl. 395*
FAGACEAE: *Quercus serrata, pl. 397*
Figwort family, 23, 47
Flag,
Blue, 5, 9, 11, 13, 15, 16
Red, 1, 7
Wine-colored, 1
Yellow, 3
Flax, New Zealand, 19, 63
FULLING, EDMUND HENRY: *Malus micromalus,* 57

Gardenia, 55
Gaultheria, 54
procumbens, 53, *plate 411*
Gelsemium sempervirens, 55
Gerardia
domingensis, 47
fasciculata, 47
Ginger, Wild, 27

Haw, Southern Black, 61
Heath family, 53
Hediondilla, 41
HOLLICK, CHARLES ARTHUR: *Quercus serrata,* 25
Holy-tree, 18
Honeysuckle family, 61
Hymenocallis, 6, 8

Ipomoea, 35
arenaria, 35
Eggersiana, 35
Steudelii, 35
IRIDACEAE: *Iris flexicaulis, pl. 389; Iris fulva, pl. 388; Iris prismatica, pl. 392; Iris Pseudacorus, pl. 386; Iris rivularis, pl. 390; Iris Shrevei, pl. 391; Iris tripetala, pl. 387; Iris vinicolor, pl. 385; Moraea iridioides, pl. 416*
Iris,
Cape White, 63
Violet, 5
Wedding, 19, 63
Iris
carolina, 11, 16
cuprea, 7
flexicaulis, 9, *plate 389*
foliosa, 9, 13
fulva, 7, *plate 388*
fulva, 1, 13
germanica, 3
gracilis, 15
hexagona, 5, 9, 13
lutea, 3
orientalis, 3
palustris, 3
prismatica, 15, *plate 392*
Pseudacorus, 3, *plate 386*
rivularis, 11, *plate 390*
savannarum, 11
Shrevei, 13, *plate 391*
tridentata, 5
tripetala, 5, *plate 387*
verna, 5
versicolor, 5, 9, 13, 16
vinicolor, 1, *plate 385*
vinicolor, 13
Iris family, 1, 3, 5, 7, 9, 11, 13, 15, 63

Jasmine, 55
Arabian, 55
Cape, 55
Carolina Yellow, 55
Italian, 55
Persian, 55
Rosy, 55
Spanish, 55
Yellow, 55
Jasminum, 55
azoricum, 55
grandiflorum, 55

humile, 55, *plate 412*
nudiflorum, 55
officinale, 55
primulinum, 55
revolutum, 55
Sambac, 55
Wallichianum, 55
Jessamine, 55

Khaya, 17

Lancehead, 43
Laurustinus, 61
Lilac, Persian, 18
LILIACEAE: *Arthropodium cirrhatum, pl. 394*
Lily family, 19
Lycopus, 13

Mahogany family, 17
MALACEAE: *Malus micromalus, pl. 413*
Malus
baccata, 57
floribunda, 57
micromalus, 57, *plate 413*
spectabilis, 57
spectabilis micromalus, 57
Marica, 63
Mato de la playa, 45
Melia, 17
Azedarach, 17, *plate 393*
MELIACEAE: *Melia Azedarach, pl. 393*
Mentha, 13
Mimosa peregrina, 37
Mimosa family, 37
MIMOSACEAE: *Niopa peregrina, pl. 403*
Mistletoe-cactus, Neves-Armond's, 59
Mo-li, 55
Moraea, 63
catenulata, 63
iridioides, 63, *plate 416*
Morning-glory family, 35
Myrica Gale, 15

Niopa, 37
peregrina, 37, *plate 403*

Oak, Serrate-leaved, 25
OLEACEAE: *Jasminum humile, pl. 412*
Olive family, 55
Opuntia, 59
Orpine family, 31

Paternosterbaum, 18
Pea family, 21, 39, 45
PENNELL, FRANCIS WHITTIER: *Agalinis fasciculata,* 47
Persian lilac, 18
PETIVERIACEAE: *Rivina humilis, pl. 410*
Phormium tenax, 19
Piercia
glabra, 51
tomentosa, 51
Pigeon-berry 51
Pineapple family, 49
Piñon espinosa, 39
Piptadenia peregrina, 37
Poke, 51
Pokeweed family, 51
Pride of India, 18
Prunus cuneata, 16
Pyrus micromalus, 57

Quamoclit, 35
Quercus,
serrata, 25, *plate 397*

Red-flag, 1, 7
Rhipsalis, 59
Neves-Armondii, 59, *plate 414*
Richardia africana, 29
Rivina, 51
humilis, 51, *plate 410*
laevis, 51
portulaccoides, 51
viridiflora, 51
Robinia florida, 21
Rock-lily, 19
Rosa setigera, 13
ROSE, JOSEPH NELSON: *Dudleya albiflora,* 31; *Rhipsalis Neves-Armondii,* 59; *Tillandsia tricolor,* 49
ROSE, JOSEPH NELSON, and BRITTON, NATHANIEL LORD: *Chamaefistula antillana,* 41; *Niopa peregrina,* 37

Sabal Deeringiana, 1
Sabinea, 21
carinalis, 21
florida, 21
punicea, 21, *plate 395*
Sagittaria, 43
lancifolia, 43, *plate 406*
Sarracenia, 6
rubra, 16
SCROPHULARIACEAE: *Agalinis fasciculata, pl. 408; Angelonia salicariaefolia, pl. 396*
Senna family, 33, 41
SMALL, JOHN KUNKEL: *Iris flexicaulis,* 9; *Iris fulva,* 7; *Iris prismatica,* 15; *Iris Pseudacorus,* 3; *Iris rivularis,* 11; *Iris Shrevei,* 13; *Iris tripetala,* 5; *Iris vinicolor,* 1
Smilax laurifolia, 15
Snowball, Japanese, 61
Stahlia, 33
maritima, 33
monosperma, 33, *plate 401*
Svida obliqua, 13

Tillandsia, Three-colored, 49
Tillandsia, 49
fasciculata, 49
tricolor, 49, *plate 409*
Ti-plant, 19
Tomato, Wild, 51

Umbrella-tree, 18

Viburnum, 61
Doublefile, 61
Fragrant, 61
Maple-leaved, 61
Thunberg, 61
Viburnum, 61
Opulus, 61
prunifolium ferrugineum, 61
rufidulum, 61, *plate 415*
rufotomentosum, 61
Violeta, 23
Violet-Iris, 5

Water-plantain family, 43
Wild-Ginger, 27
WILSON, PERCY: *Asarum canadense,* 27; *Rivina humilis,* 51; *Sagittaria lancifolia,* 43
Wintergreen, 53

Yellow-flag, 3
Ye-si-min, 55

Zantedeschia,
aethiopica, 29, *plate 399*
Elliottiana, 29
Rehmannii, 29